United States
Department of
Agriculture

Soil
Conservation
Service

In cooperation with
Cornell University
Agricultural Experiment
Station

Soil Survey of Greene County, New York

How To Use This Soil Survey

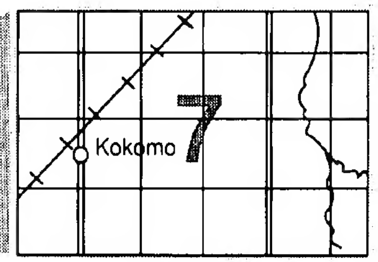
General Soil Map

The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

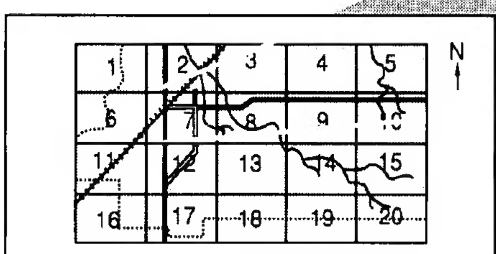
Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.



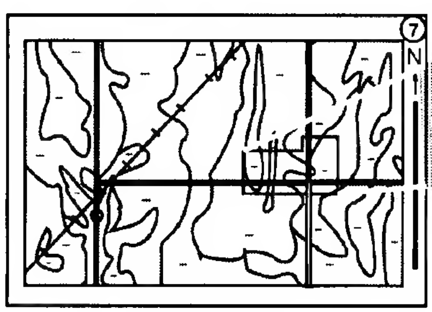
MAP SHEET

To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.

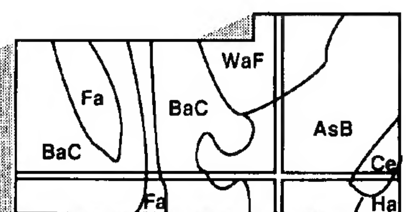


INDEX TO MAP SHEETS

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** (see Contents), which lists the map units by symbol and name and shows the page where each map unit is described.



MAP SHEET



AREA OF INTEREST

NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1984. Soil names and descriptions were approved in 1985. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1985. This survey was made cooperatively by the Soil Conservation Service and the Cornell University Agricultural Experiment Station. The survey is part of the technical assistance furnished to the Greene County Soil and Water Conservation District. The Greene County Legislature through the Greene County Soil and Water Conservation District provided partial funding for this survey. The New York State Department of Agriculture and Markets provided additional funding.

Cover: Area near Tower Mountains, west of the village of Windham. Halcott, Vly, and Tor soils are dominant on the peak. Lewbeach, Willowemoc, and Onteora soils are dominant in the valley.

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Issued February 1993

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Foreword

This soil survey contains information that can be used in land-planning programs in Greene County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

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Soil Survey of
Greene County, New York

By William A. Broad, Soil Conservation Service

Fieldwork by Bruce W. Templeton and Bradford Weisenburn, Greene County Soil and Water Conservation District, and Theodore D. Trevail, Steven E. Page, Ralph Work, and William A. Broad, Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service,
in cooperation with
Cornell University Agricultural Experiment Station

GREENE COUNTY is in the mideastern part of New York State (fig. 1). It has an area of 417,920 acres, or about 653 square miles *(8)*. It is south of Albany and Schoharie Counties.

Elevation in the county ranges from sea level at the Hudson River to 4,025 feet at the peak of Hunter Mountain. In 1980, the population of the county was 40,495. Woodland makes up about 59 percent of the county; a state forest preserve makes up about 70,000 acres, or nearly 17 percent of the county *(5)*.

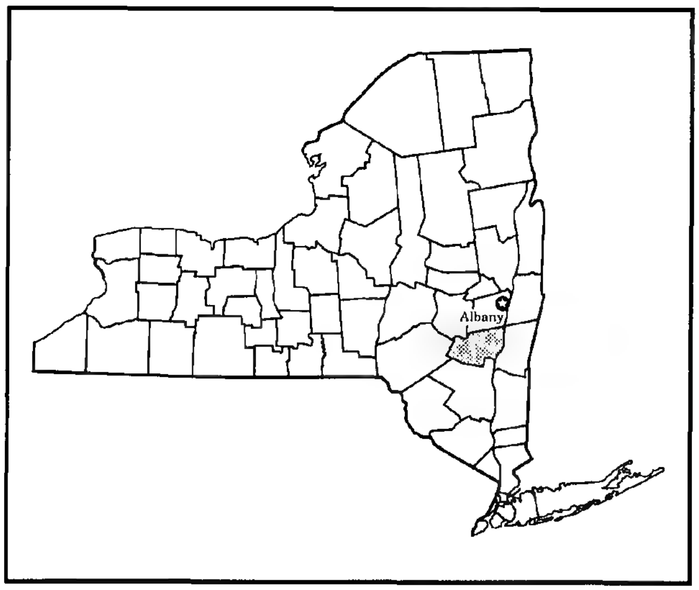

Figure 1.—Location of Greene County in New York.

General Nature of the County

This section provides general information about Greene County. It describes drainage, water supply and transportation facilities, history, physiography and geology, and climate.

Drainage

Greene County is in four drainage systems—the Schoharie, Catskill, Kaaterskill, and Hudson River. The Schoharie, along with its East, West, and Batavia Kills, drains water in most of the mountains northwest into the Gilboa Reservoir and eventually into the Mohawk River.

The Catskill flows southeast into the county at Cooksburg and starts around Franklinton, in Albany County. It empties into the Hudson at Catskill. The main feeders are Basic and Potic Creeks and the Bakkers, Vosen, and Kaaterskill.

The Kaaterskill rises near Haines Falls, plunging into the lowlands and flowing into Catskill Creek west of the village of Catskill. Its main tributaries are Vly Creek, Kiskatom Brook, and Stony Brook.

The Hudson River flows north to south from the upper Adirondacks into the Atlantic Ocean, draining and bordering Greene County on the east. The principal

feeder streams are Murderers, Catskill, and Coxsackie Creeks.

From the town of Halcott, the drainage feeds the Delaware Basin and eventually moves down through the Susquehanna River and into the Chesapeake Bay. The main streams are Vly, Elkard, and Brownell Creeks.

Water Supply and Transportation Facilities

Generally, most of the water supply in the county is drawn from wells, reservoirs, streams, and springs. Most of the wells are deep and are drilled, but some are dug by hand.

Some of the villages obtain their supply of water from manmade lakes or reservoirs. Others, such as the village of Catskill, tap the nearby Catskill Creek. In a few areas where seepage is considerable, springs have been established.

The Hudson River, which flows along and borders the eastern side of the county, is a huge water source.

The New York State Thruway, I-87, runs through Greene County. It is the only four-lane, north-south highway in the county. The nearest rail depot is in the city of Hudson, on the east side of the Hudson River. The nearest commercial airport is in Albany.

History

Greene County was formed by an act of the New York State Legislature on March 25, 1800. The county originally had 4 towns and now has 14. Prior to the formation of the county, the survey area was inhabited by Indians, the Dutch, and the English.

The Dutch were the first European settlers, arriving during the early part of the 17th century. Many were fur traders. Agriculture became important when English settlers arrived in the next century. Large acreages were cleared for farming. The farms were abandoned as a result of degradation caused by erosion. Some of the areas that were formerly cropped have reverted to forest.

Since early settlement Greene County has had many industries, including tanneries, quarries, companies that supplied ice from the Hudson River, and fur-trapping enterprises. The common modern industries are centered on cement, mushrooms, and tourism. A few subsidiaries of major corporations are in scattered areas throughout the county.

Most of the farms in Greene County are dairying enterprises in the major stream valleys and on the Hudson lake plain. There were 301 farms in the county in 1982, covering a total of 63,598 acres *(13)*.

Physiography and Geology

Greene County is in two physiographic provinces. These are the Catskill section of the Appalachian Plateau and the Hudson Valley section of the Ridge and Valley Province *(3)*.

The Catskill section encompasses the mountainous southwestern part of the county. It extends to the northeast and terminates at the base of the northeastern escarpment, or the Mural Front. Although technically they are part of the Appalachian Plateau, the Catskill Mountains rise nearly 2,000 feet above the adjacent plateau on the north and west. The peaks of the Catskills are generally highest near the Mural Front and decrease in height toward the west and northwest; however, the highest summit, Hunter Mountain, at 4,025 feet, lies to the west of the Mural Front and south of the Schoharie Valley. The mountains, especially individual ranges, are primarily the products of stream erosion.

The Hudson Valley section of the Ridge and Valley Province has three physiographic subdivisions. These are a level terrace bordering the Hudson River; a range of low hills, about 1 mile wide, known as the Kalkberg; and higher hills known as the Hoogeberg.

The terrace along the Hudson River ranges in elevation from about 100 feet in the south to about 150 feet in the north. The Hudson River is entrenched about 100 feet into this terrace. The deposits are flat beds of sand and clay. The original surface is dissected by short tributaries of the river. These tributaries have produced gullies. Ordovician shale and sandstone underlie the terrace deposits. In some areas they are exposed, forming low hills.

The Kalkberg (Dutch for "limestone mountain") is a series of low hills parallel to and west of the terrace along the Hudson River. Contact of the Kalkberg with the terrace is sharp in most places, and the hills are less than 1 mile wide. The hills range in elevation from 300 feet in the south to 500 feet in the north. They consist of limestone, shale, and sandstone of Late Silurian and Devonian age.

The Hoogeberg (Dutch for "high mountain") is a range between the Kalkberg on the east and the broad plain called the Kiskatom Flats on the west. The Hoogeberg is made up of numerous rounded hills rather than indistinct ranges. In the southern part, the rocks dip gently westward. In the north-central part, the dip of the underlying rocks is to the southwest. The elevation of the summits of the Hoogeberg ranges from 800 feet near the Hudson to 1,000 feet at Durham. The elevation continues to increase until the Hoogeberg merges with a 2,000-foot plateau in Albany and Schoharie Counties.

The geologic deposits in Greene County are of two major types—consolidated bedrock of sedimentary origin and unconsolidated surficial deposits of alluvial or glacial origin. The consolidated bedrock underlies the entire county and is the oldest type of deposit. It has been distorted and folded and has many faults and points. The more recent unconsolidated deposits mantle most of the county. They are thickest in valleys and other low areas *(3)*.

Geologic history began in the survey area with mud and sand depositions in shallow seas during the Upper Cambrian and Lower Ordovician periods. The rocks that formed in these materials belong to the Lower Ordovician and Upper Cambrian Clastics (OC). They consist of several formations, ranging from shale to limestone. By the Middle Ordovician, the sea had withdrawn to the west and marine sediments consisting of shales of the Normanskill Formation (On) had become folded and uplifted into mountain ranges. These mountains were subsequently eroded. Various shales of the Normanskill Formation (On) are at or near the surface in a broad area adjacent and parallel to the Hudson River (see the general geology map at the back of this survey).

As erosion continued into the Early and Middle Silurian Epochs, the mountains were smoothed to a low plain. During the Late Silurian the sea once more advanced, causing sequences of muds and limy muds to accumulate over the Normanskill shales. These depositions took place during the Late Silurian and the Early and Middle Devonian periods. The Silurian deposits belong to the Helderberg Group and Undifferentiated Silurian Rocks (DS). They include limestones and shales. The Early and Middle Devonian deposits, in order from the oldest to the youngest, are Rondout and Manlius limestones of the Helderberg Group (Dhg); Coeymans, New Scotland, and Becraft limestones, also of the Helderberg Group; and Esopus shale and Schoharie shale of the Onondaga Limestone-Schoharie Formation (Dou). Because these sediments are largely limy muds or sands consisting mostly of shell fragments, the sea is presumed to have been shallow and bordered by low areas. During this interval, the land to the northeast eventually began to rise, the accumulation of lime ceased, and black mud, which became Bakoven shale, was deposited. This shale represents the youngest deposits of the Onondaga Limestone-Schoharie Formation (Dou).

As the land continued to rise toward the northeast during the Middle Devonian, the type of deposits near the shore of the sea changed from black mud to gray silt and sand. These early deposits of the Kiskatom Formation (Dha) consist of shale and sandstone. A delta formed to the west during this time. Sand and silt deposited in fresh water or under subaerial conditions are the youngest deposits of the Kiskatom Formation (Dha). They consist of red and green shale and smaller amounts of sandstone.

After the formation of the Catskill Mountains, a long period of general uplift occurred. This period was one of erosion rather than deposition, although there may have been brief periods of continental deposition. Throughout the remainder of the Paleozoic, Mesozoic, and most of the Cenozoic periods, continued erosion resulted in the present general topography and aspect in the county.

The Pleistocene Epoch featured the movement of continental ice sheets and glaciers from the north. This movement smoothed and sculpted the valleys and hills, depositing unsorted debris or till on the consolidated bedrock. Glacial lakes formed in valleys, such as those of the Hudson River, Schoharie Creek, and Batavia Kill. Deposits, principally of clay and silt, were laid down in these lakes. Meltwater deposited stratified sand and gravel as it flowed from the melting glacial ice. By the end of the Pleistocene, the topography of the survey area appeared very much as it does today.

All of the consolidated and unconsolidated deposits in the survey area have unique characteristics. The principal deposits and their locations are described in the following paragraphs.

Normanskill Formation (On).—These deposits underlie an area 1 to 3 miles wide in the extreme eastern part of the county (see the general geology map at the back of this survey). Deepkill shale is mainly green, siliceous shale; sandy shale; black graptolite-bearing shale; and some thin beds of limestone and chert. Normanskill is chiefly a gray, arkosic sandstone with some chert and dark gray to black shale. The chert consists of black, red, or green nodules that weather to white. The entire formation is greatly folded and faulted.

Rondout and Manlius limestones of the Helderberg Group (Dhg).—This sequence of limestone underlies a narrow belt less than a mile wide, extending from the northern to the southern county line (see the general geology map at the back of this survey). It adjoins the Normanskill Formation on the west and passes through the villages of Cometon and Climax. The formations are considerably folded and faulted, and the intensity of deformation increases from north to south. The more massive beds form cliffs, so that the belt is marked by an almost continuous escarpment, about 100 feet high, which rises above the Hudson Valley and is backed by a short, steep parallel ridge. The Rondout ranges from drab water lime in the north to sand and reefy beds in the south. The Manlius is a dark, fine grained, laminated limestone that weathers to light gray. The other members of the Helderberg Group, namely, the Coeymans, New Scotland, and Becraft members, range

from fairly pure limestone to limestone that is very impure and shaly. The Coeymans, together with the underlying Manlius, and the Becraft have been intensively quarried for lime and cement, and large cement quarries are still active in the area south of the village of Catskill.

Onondaga Limestone-Schoharie Formation (Dou).—This group consists of three members: Esopus shale, Bakoven shale, and Schoharie shale and Onondaga limestone. These rocks crop out in a narrow band roughly parallel to I-87.

The Esopus shale overlies the Helderberg Group. In the northern part of the survey area, most outcrops are several hundred feet wide. In the central and southern parts, however, they become irregular in width. Rock types include siltstone and fine sandstone. The Esopus shale is characterized by joints and by well developed fracture cleavage.

The Schoharie shale and Onondaga limestone underlie a narrow area extending from north to south. They lie close to the villages of Limestreet and Leeds and are west of and similar to the belt underlain by the Rondout and Manlius limestones of the Helderberg Group. The Schoharie shale and Onondaga limestone locally form conspicuous ridges. Schoharie shale is high in content of limestone. Onondaga is purer limestone, and in places it is crystalline. Seams of chert are features of both members. The Schoharie is dark brown, and the Onondaga is light gray to blue gray. In some areas, the Schoharie has well developed fracture cleavage and the Onondaga has a well developed system of joints.

The Bakoven shale crops out in a long, narrow belt directly west of the Onondaga Limestone-Schoharie Formation. In the southern area it underlies a valley between the Helderberg Group on the west and the Onondaga limestone terrace on the east. In the northern part of the county, it is more resistant and underlies hills or benches on the dip slope of the Onondaga. It is fine grained fossil shale. Generally, the Bakoven shale is black. In the northern part of the county, however, gray shale is intercalated. The Bakoven shale is generally incompetent, and exposures are uncommon. Where apparent, it is crumpled and has slickensides.

Kiskatom Formation (Dha).—This group crops out west of the Onondaga Limestone-Schoharie Formation in a broad area extending from the northern to the southern county line. It broadens in the north, where the formation is thickest. In the south the formation is exposed on the west slope of the Helderberg Group. In the north it underlies a hilly area nearly 4 miles wide. It is resistant and forms part of the foothills of the Catskill Mountains. The formation consists of alternating sandstone and shale. The sandstone is gray, arkosic, and laminated and has often been quarried and used for flagstone. The shale is olive green and weathers to a rust color. The Kiskatom Formation is distinctly bedded and has a low, westerly dip. The sandstones are cut by strong joints, while the shales generally are closely fractured and black.

Lower Hamilton Group (Dhm).—This group rests above the Kiskatom Formation. It is Middle Devonian in age and is in an area between the Onondaga Limestone-Schoharie Formation to the east and the Kiskatom Formation to the west. It consists mostly of shale and siltstone. The Potic Mountains are within this group.

Oneonta Formation (Dgk).—This formation consists of red shale and sandstone. It is one of the two most extensive formations in the county. It covers most of the Catskill Mountains north of Schoharie Creek, except for the highest peaks.

Stony Clove Formation (Dss).—This formation covers most of the Catskill Mountains south of Schoharie Creek and the high peaks to the north. It consists mainly of sandstone and conglomerate and lesser amounts of shale.

Lower Katsberg Formation (Dsd).—This formation is in areas in the Catskill Mountains adjacent to the Stony Clove Formation, upon which it rests. It consists of sandstone, red shale, and siltstone.

Upper Katsberg Formation (Djwh).—This formation is on the high peaks south of Schoharie Creek in the Catskill Mountains. It consists of red sandstone, siltstone, and conglomerate.

Unadilla, Laurens, New Lisbon, and Gilboa Formations (Dgu).—These formations are in a small area near Prattsville, in the western part of the county. The rock types consist of sandstone, siltstone, and shale.

The general geology map at the back of this survey shows the dominant rock type for each formation or group. On the map legend the abbreviation *Sh* means shale; *Ss*, sandstone; *Ls*, limestone; *Gwke*, graywacke; *Slst*, siltstone; *Chrt*, chert; *Sl*, slate; and *Cge*, conglomerate.

Unconsolidated deposits.—These deposits cover the bedrock throughout nearly all of the county. They are more than 200 feet deep in a few places. Except for areas of alluvium along present-day streams, the deposits are glacial drift. They occur as unsorted deposits, or till, and as well sorted deposits, or stratified drift.

Till occurs throughout the county in the form of ground moraines, which are in areas of relatively thin, widespread layers of till; drumlins, which are elongated hills; and moraines, or masses of till deposited at the edge of glaciers. The till consists of earthen debris

picked up by the glacier and quickly deposited during the advance or melting of the ice. It is typically unsorted rock debris having a wide range of grain or particle sizes.

Stratified glacial drift, commonly termed glacial outwash, is a stratified deposit, mainly of sand and gravel, occurring as stream terraces, deltas, glacial lake margins, and kettle-kame outwash. In places the outwash is overlain or underlain by till with no sharp dividing line between the kinds of material.

Climate

Prepared by the National Climatic Data Center, Asheville, North Carolina.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Freehold, New York, in the period 1963 to 1979. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 24 degrees F and the average daily minimum temperature is 15 degrees. The lowest temperature on record, which occurred at Freehold on January 11, 1968, is -26 degrees. In summer, the average temperature is 68 degrees and the average daily maximum temperature is 80 degrees. The highest recorded temperature, which occurred at Freehold in July of 1964, is 99 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (40 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is about 37 inches. Of this, nearly 18 inches, or about 50 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 13 inches. The heaviest 1-day rainfall during the period of record was 4.35 inches at Freehold on August 28, 1971. Thunderstorms occur on about 27 days each year.

The average seasonal snowfall is about 68 inches. The greatest snow depth at any one time during the period of record was 29 inches. On the average, 69 days of the year have at least 1 inch of snow on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 55 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The sun shines 60 percent of the time possible in summer and 40 percent in winter. The prevailing wind is from the south. Average windspeed is highest, 11 miles per hour, in spring.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material has few or no roots or other living organisms and has been changed very little by other biological activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to

taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by two or three kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. These latter soils are called inclusions or included soils.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are named and mentioned in the map unit descriptions. A few inclusions may not have been observed and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soil on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

General Soil Map Units

The general soil map at the back of this publication shows the soil associations in this survey area. Each association has a distinctive pattern of soils, relief, and drainage. Each is a unique natural landscape. Typically, an association consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one association can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one association differ from place to place in slope, depth, drainage, and other characteristics that affect management.

A general soil map is in each of the soil surveys of Ulster County and Schoharie County, both of which border Greene County. Recent surveys, including general soil maps, have been completed for the other adjacent counties, Columbia and Albany.

The names of adjoining map units on the general soil maps of the adjacent counties are not the same in all instances because the proportions of the major soils differ from one survey to another. The maps do not join perfectly because of differences in map scale from county to county. Also, in the case of Schoharie and Ulster Counties, the concepts and names of some soil series have changed as a result of changes in the classification system since the publication of those surveys.

Soil Descriptions

Medium Textured and Moderately Fine Textured Soils Formed in Glacial Till on Uplands

The five general soil map units in this group make up about 36.2 percent of the county. Most areas are used as woodland. The units are in upland areas adjacent to and in the Catskill Mountains and their foothills. The areas in the Catskills are at the lower elevations of the mountains. They have a slightly longer growing season than those at the higher elevations and have different plant communities.

1. Wellsboro-Oquaga-Morris Association

Very deep and moderately deep, nearly level to steep, somewhat excessively drained to somewhat poorly drained, medium textured soils on foothills of the Catskill Mountains

This unit makes up about 5 percent of the county. It is along the northeast foothills of the Catskill Mountains. The landscape is characterized by hills and mountainsides influenced by the underlying bedrock. Many areas have stones or boulders at the surface. Slopes are dominantly 15 to 25 percent but range from 0 to 35 percent. The soils formed in glacial till derived mainly from massive, reddish sandstone and thinly bedded siltstone.

This unit is about 31 percent Wellsboro soils, 12 percent Oquaga soils, 10 percent Morris soils, and 47 percent soils of minor extent (fig. 2).

The very deep Wellsboro soils are on the tops and sides of hills and ridges. The soils are moderately well drained. A dense fragipan in the lower part of the subsoil restricts water movement.

The moderately deep Oquaga soils are on the tops and sides of hills and plateaus influenced by the underlying bedrock. The soils are well drained and somewhat excessively drained and are underlain by sandstone or siltstone at a depth of 20 to 40 inches.

The very deep Morris soils are on the lower parts of hills and side slopes. The soils are somewhat poorly drained. A dense fragipan in the lower part of the subsoil restricts water movement.

Of minor extent in this unit are Arnot, Tunkhannock, Valois, Lackawanna, Alden, Mardin, Volusia, and Lordstown soils. The very deep Lackawanna, Mardin, and Volusia soils are well drained, moderately well drained, and somewhat poorly drained, respectively.

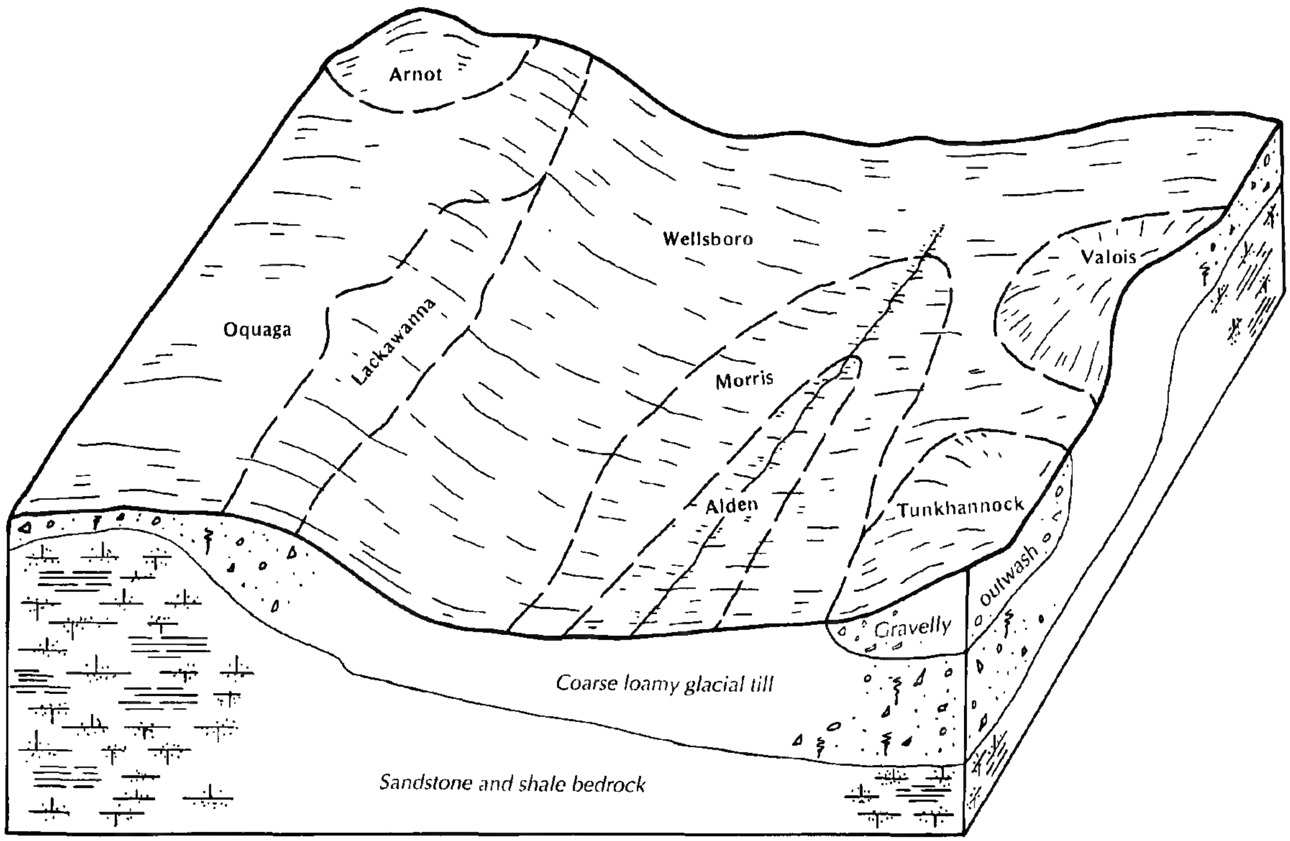

Figure 2.—Typical pattern of soils and underlying material in the Wellsboro-Oquaga-Morris association.

They have a dense fragipan in the lower part of the subsoil that restricts water movement. The very deep Alden soils are poorly drained and very poorly drained. The moderately deep Lordstown soils are well drained. They are underlain by bedrock at a depth of 20 to 40 inches. The very deep Tunkhannock soils are somewhat excessively drained and well drained. They formed in outwash deposits. The very deep Valois soils are well drained. They formed in glacial till. The shallow Arnot soils are somewhat excessively drained to moderately well drained and formed in till.

Most areas of this unit are used as woodland or pasture. Many of the less sloping areas are used for cultivated crops. The potential productivity of the unit for northern red oak is moderately high. The slope is a limitation. The suitability for cultivated crops is influenced mainly by the slope. Some gently sloping areas are well suited; the moderately steep and steep areas are unsuited. Other limitations in the areas used as cropland are seasonal wetness and the moderate depth to bedrock.

2. Arnot-Lordstown Association

Shallow and moderately deep, nearly level to very steep, somewhat excessively drained to moderately well drained, medium textured soils in the Catskill Mountains and their foothills

This unit makes up about 14 percent of the county. It is in the eastern foothills and mountains. The landscape is characterized by hills and valley sides, the configuration of which is controlled mainly by the underlying bedrock. Rock outcrops and ledges are common throughout the unit. Slopes range from 0 to 55 percent. The soils formed in glacial till derived mainly from interbedded siltstone and shale and massive sandstone.

This unit is about 34 percent Arnot soils, 17 percent Lordstown soils, and 49 percent soils of minor extent.

The shallow Arnot soils are somewhat excessively drained to moderately well drained. They are on the tops and sides of hills and on valley walls, commonly on steps and benches. Bedrock is at a depth of 10 to 20 inches.

The moderately deep Lordstown soils are on the slightly wider hills and valley walls. They are well drained. Bedrock is at a depth of 20 to 40 inches.

Of minor extent in this unit are Nassau, Valois, Mardin, and Tuller soils and Rock outcrop. Nassau soils are somewhat excessively drained and are shallow to folded shale. Valois soils are well drained and very deep. Mardin soils are somewhat poorly drained. They are very deep and have a fragipan in the lower part of the subsoil. Tuller soils are somewhat poorly drained and poorly drained. They are shallow to sandstone, siltstone, and shale.

Most areas of this unit are used as woodland. Some areas are used as pasture. Some areas that formerly were used for cultivated crops or pasture are now idle and support brush. The potential productivity for northern red oak is moderate. The slope and the shallowness to bedrock are limitations. The suitability for pasture is influenced mainly by the slope and the depth to bedrock. The less sloping, moderately deep soils are well suited; the steep and very steep, shallow soils are unsuited.

3. Arnot-Oquaga Association

Shallow and moderately deep, nearly level to very steep, somewhat excessively drained to moderately well drained, medium textured soils on the foothills of the Catskill Mountains

This unit makes up about 5 percent of the county. It is in the east-central foothills. The landscape is characterized mainly by hillsides and ridgetops configured by the underlying interbedded bedrock. Because of erosion, steps and short slopes are common. Slopes are mainly 2 to 25 percent but range from 0 to 55 percent. The soils formed in glacial till derived mainly from interbedded sandstone and siltstone.

This unit is about 31 percent Arnot soils, 28 percent Oquaga soils, and 41 percent soils of minor extent.

The shallow Arnot soils are somewhat excessively drained to moderately well drained. They are on side slopes and benches on the steepest parts in the unit. Rock outcrops and ledges are in many areas.

The moderately deep Oquaga soils are on ridges and hills and on the less sloping benches.

Of minor extent in this unit are Tuller, Valois, Lackawanna, and Wellsboro soils. Tuller soils are somewhat poorly drained and poorly drained. They are shallow to bedrock. Valois soils are well drained and very deep. Lackawanna and Wellsboro soils are very deep and have a fragipan in the lower part of the subsoil.

Most areas of this unit are used as woodland. Some areas are used as pasture. The potential productivity for northern red oak is moderate or moderately high. The slope and the shallowness to bedrock are limitations. The gently sloping areas are well suited to pasture, but the steep and very steep areas are unsuited.

This unit provides habitat for some woodland wildlife. Large areas are in the New York State Catskill Park.

4. Nassau-Farmington Association

Shallow, gently sloping to very steep, well drained and somewhat excessively drained, medium textured soils on hills and ridges

This unit makes up about 5.2 percent of the county. It is in the uplands in the eastern part of the county. Most of the acreage is in a single unit. The landscape is influenced mainly by the underlying folded and twisted limestone, shale, and slate in a narrow band extending north to south. Slopes range from 2 to 45 percent. The soils formed in glacial till derived from limestone, shale, and slate.

This unit is about 36 percent Nassau soils, 34 percent Farmington soils, and 30 percent soils of minor extent.

Nassau soils are somewhat excessively drained. They are in rolling, hilly, or steep areas in the western part of the unit.

Farmington soils are well drained and somewhat excessively drained. They are mainly in the eastern part of the unit.

Of minor extent in this unit are Tuller, Rhinebeck, Galway, and Valois soils and Rock outcrop. Tuller soils are somewhat poorly drained and poorly drained and are shallow to bedrock. They are in shallow drainageways. Rhinebeck soils are very deep and somewhat poorly drained. They are in areas of lacustrine deposits. Galway soils are moderately deep and well drained. Valois soils are very deep and well drained. They are mainly on the lower parts of the slopes. Rock outcrop is intermingled with areas of Farmington and Nassau soils on the sides of hills and ridges:

Most areas of this unit are used as woodland. Areas in the southern part of the unit are being mined and quarried. The potential productivity of this unit for sugar maple is moderate.

5. Burdett-Nunda-Lyons Association

Very deep, nearly level to steep, moderately well drained to very poorly drained, moderately fine textured soils on till plains

This unit makes up about 7 percent of the county. It is mainly in the northern part of the county, northeast of

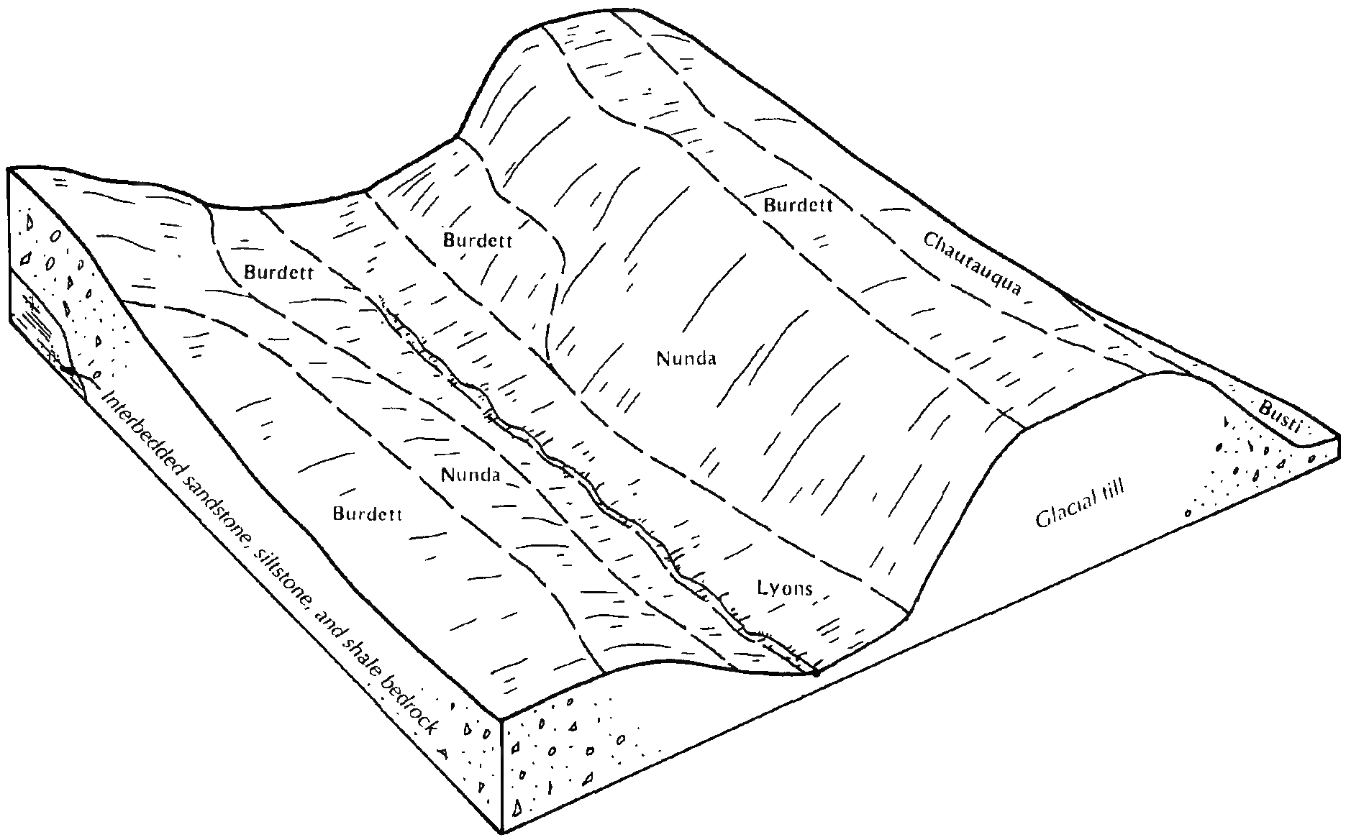

Figure 3.—Typical pattern of soils and underlying material in the Burdett-Nunda-Lyons association.

the Catskill Mountains, extending southward to about Freehold. Slopes range from 0 to 35 percent. The soils formed in glacial till influenced by shale.

This unit is about 28 percent Burdett soils, 24 percent Nunda soils, 8 percent Lyons soils, and 40 percent soils of minor extent (fig. 3).

Burdett soils are somewhat poorly drained. They have a moderately fine textured subsoil that restricts the downward movement of water. These soils are on the tops of drumlins and near the head of drainageways.

Nunda soils are moderately well drained. They have a moderately fine textured subsoil that restricts the downward movement of water. These soils are on the more sloping parts of the unit.

Lyons soils are poorly drained and very poorly drained. They are in depressions and at the base of the hills.

Of minor extent in this unit are Busti, Chautauqua, Valois, Tuller, and Alden soils. Busti, Chautauqua, and Valois soils formed in medium textured till. They range from somewhat poorly drained to well drained. Tuller soils are shallow to bedrock and are somewhat poorly drained and poorly drained. Alden soils formed in medium textured till and are poorly drained and very poorly drained.

Most areas of this unit are used as woodland and provide habitat for some wildlife species. Wood products, such as firewood and maple syrup, are harvested in places. Some areas are used as cropland or pasture. The potential productivity for sugar maple is moderate. Seasonal wetness, the slope, and the hazard of erosion are limitations in the areas used for cultivated crops.

Medium Textured Soils Formed in Glacial Till at the Higher Elevations in the Catskill Mountains

The three general soil map units in this group make up about 57.8 percent of the county. Most areas are used as woodland. The units in this group have a slightly shorter growing season and generally lower temperatures than the other units.

6. Lewbeach-Willowemoc-Onteora Association

Very deep, gently sloping to very steep, well drained to somewhat poorly drained, medium textured soils on hills and valley sides

This unit makes up 17.4 percent of the county. It is in the upper part of the Catskill Mountains. The landscape is characterized by hills and valley sides. The lower valley sides are mostly smooth. Most areas of the unit have stones and boulders at the surface. Slopes are dominantly 8 to 25 percent but range from 3 to 55 percent. The soils formed in reddish glacial till derived from sandstone, siltstone, and shale.

This unit is about 49 percent Lewbeach soils, 22 percent Willowemoc soils, 16 percent Onteora soils, and 13 percent soils of minor extent (fig. 4).

Lewbeach soils are well drained and have a fragipan that restricts the downward movement of water. They are on the upper part of the valley walls.

Willowemoc soils are moderately well drained and have a fragipan. They are on valley walls and the lower parts of convex hills.

Onteora soils are somewhat poorly drained and have a fragipan. They are on less sloping parts of the unit.

Of minor extent in this unit are the well drained Elka and Maplecrest soils and the poorly drained and very poorly drained Suny soils, none of which has a fragipan.

Most areas of this unit are native forest and provide habitat for woodland wildlife. The potential productivity for sugar maple is moderate.

7. Vly-Halcott Association

Moderately deep and shallow, gently sloping to very steep, somewhat excessively drained to moderately well drained, medium textured soils on ridges and mountainsides

This unit makes up about 31.1 percent of the county. It is in the Catskill Mountains. The landscape consists mostly of the upper mountainsides and ridgetops influenced by the underlying interbedded bedrock that, because of weathering and erosion, forms a series of steps and short, very steep slopes. Slopes range from 3 to 55 percent. The soils formed in glacial till derived from interbedded sandstone and siltstone.

This unit is about 43 percent Vly soils, 30 percent Halcott soils, and 27 percent soils of minor extent.

Vly soils are well drained and somewhat excessively drained. They are commonly very rocky and are on the deeper part of the steps and benches.

Halcott soils are somewhat excessively drained to moderately well drained. They are very rocky and are

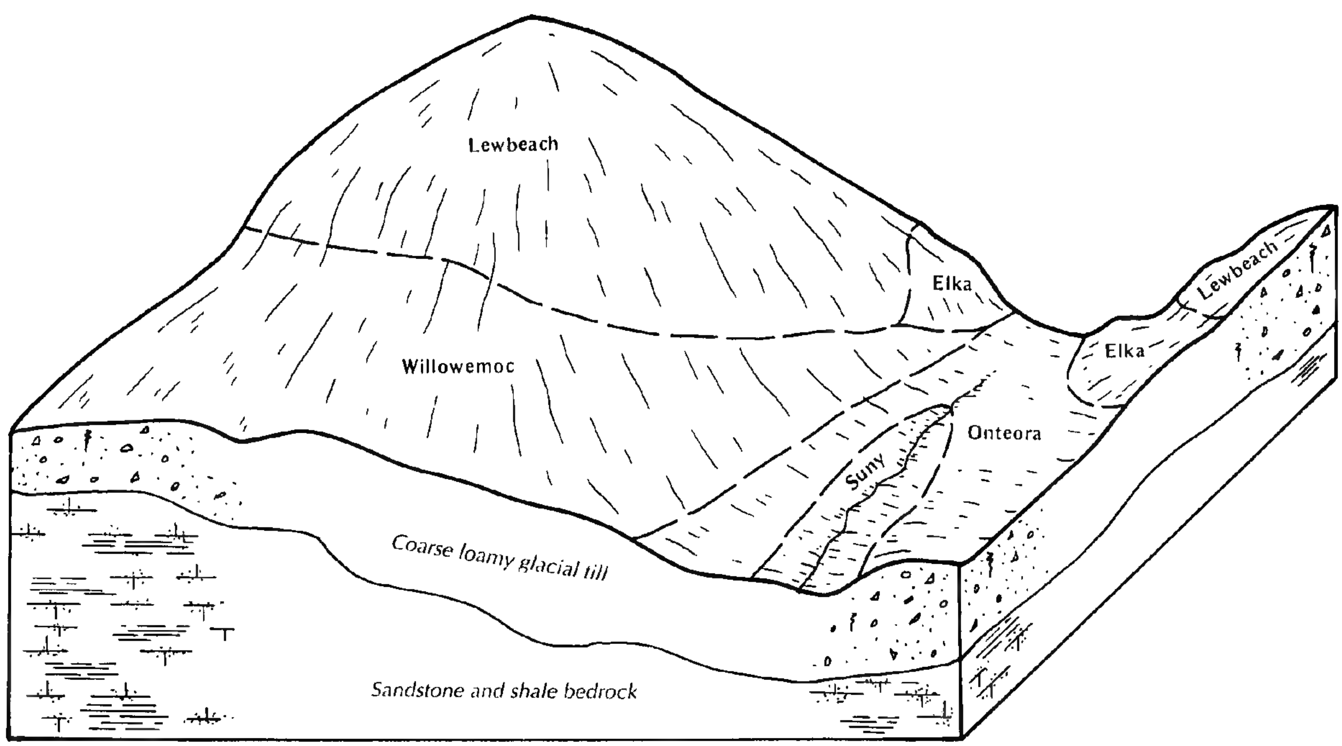

Figure 4.—Typical pattern of soils and underlying material in the Lewbeach-Willowemoc-Onteora association.

commonly in areas between the steps and benches.

Of minor extent in this unit are Tor, Elka, and Lewbeach soils and Rock outcrop. Tor soils are shallow to bedrock and are somewhat poorly drained and poorly drained. They are in depressions and seep spots. Elka soils are well drained and very deep. They are on slopes on the upper part of the mountains. Lewbeach soils are well drained and very deep. They have a fragipan in the lower part of the subsoil that restricts the downward movement of water. They are in convex areas.

Most areas of this unit are woodland in the New York State Catskill Park. The potential productivity for northern red oak is moderate or moderately high. The slope, surface stones, the shallowness to bedrock, the Rock outcrop, erosion, and a low available water capacity are limitations in the areas used for cultivated crops.

8. Elka Association

Very deep, gently sloping to very steep, well drained, medium textured soils on the sides of valleys

This unit makes up about 9.3 percent of the county. It is in the Catskill Mountains. It is mainly on the upper mountain slopes at high elevations. The landforms are smooth and include deposits of slope wash along drainageways. Slopes are dominantly 15 to 35 percent but range from 3 to 70 percent. The soils formed in glacial till derived from reddish sandstone and siltstone.

This unit is about 82 percent Elka soils and 18 percent soils of minor extent.

Elka soils are on valley walls. They are well drained and very deep.

Of minor extent in this unit are Lewbeach, Vly, and Onteora soils. Lewbeach soils are well drained and have a dense fragipan in the lower part of the subsoil. Vly soils are moderately deep to bedrock and are well drained and somewhat excessively drained. They are on valley sides near the head of drainageways. Onteora soils are somewhat poorly drained and have a dense fragipan. They are in plane areas where runoff accumulates.

Most areas of this unit are used as woodland. The potential productivity for sugar maple is moderate. The slope, the hazard of erosion, surface stones, and a short growing season are limitations in the areas used for cultivated crops.

Fine Textured Soils Formed in Lacustrine Sediments on Lake Plains

These soils make up about 4 percent of the county. Most areas are used as woodland, but some are used as cropland or pasture.

9. Kingsbury-Rhinebeck-Hudson Association

Very deep, nearly level to very steep, moderately well drained and somewhat poorly drained, fine textured soils on ridges and side slopes

This unit makes up about 4 percent of the county. It is on glacial lakebeds near the Hudson River. Slopes are dominantly 0 to 8 percent but range from 0 to 50 percent. The steeper slopes are in drainageways. The soils formed in fine textured and very fine textured lacustrine sediments.

This unit is about 25 percent Kingsbury soils, 20 percent Rhinebeck soils, 20 percent Hudson soils, and 35 percent soils of minor extent.

Kingsbury soils are somewhat poorly drained and have a fine textured subsoil. They are on broad flats and in shallow drainageways.

Rhinebeck soils are somewhat poorly drained and have a fine textured subsoil. They are on broad flats and in shallow drainageways.

Hudson soils are moderately well drained and have a fine textured subsoil. They are on ridges between drainageways and are along the sides of the drainageways.

Of minor extent in this unit are Vergennes, Covington, and Madalin soils. Vergennes soils are moderately well drained and have a very fine textured subsoil. They are on ridges between drainageways and are on the sides of drainageways. Covington and Madalin soils are on broad flats that are the lowest part of the landscape. Covington soils are poorly drained. Madalin soils are poorly drained and very poorly drained.

Most areas of this unit have been cleared of trees for agricultural uses but are reverting to forest. Some areas are still used as cropland, and many others are used for hay or pasture. Seasonal wetness, poor tilth, and erosion are the main limitations in the areas used for cultivated crops.

Medium Textured Soils Formed in Alluvial Sediments on Flood Plains

These soils make up about 2 percent of the county. Most areas are used as cropland or pasture. Some of the major soils meet the requirements for prime farmland.

10. Barbour-Wayland-Basher Association

Very deep, nearly level, well drained, moderately well drained, poorly drained, and very poorly drained, medium textured soils on flood plains

This unit makes up about 2 percent of the county. It is on flood plains along Catskill, Kaaterskill, and

Schoharie Creeks. The soils formed in alluvial sediments derived from reddish sandstone, siltstone, and conglomerate.

This unit is about 53 percent Barbour soils, 17 percent Wayland soils, 11 percent Basher soils, and 19 percent soils of minor extent.

Barbour soils are well drained. They are subject to occasional flooding. They are in areas near stream channels and in old oxbows and former stream channels.

Wayland soils are poorly drained and very poorly drained. They are subject to frequent flooding. They are in old oxbows and channels and on the depressional parts of the flood plains farthest from the stream channels.

Basher soils are moderately well drained. They are subject to occasional flooding. They are slightly lower on the flood plains than Barbour soils and are farther from the stream channels.

Of minor extent in this unit are Fluvaquents and Udifluvents and Tioga and Middlebury soils. Fluvaquents and Udifluvents occur together on the landscape in areas directly adjacent to the stream channels, where stream deposits are scoured, sorted, and redeposited. These soils are subject to frequent flooding. Tioga soils are well drained and are on the higher parts of the flood plains. Middlebury soils are somewhat poorly drained and are in slightly lower areas farther from the stream channels.

Most areas of this unit are used for cultivated crops, hay, or pasture. Flooding and seasonal wetness are the main limitations in the areas used as cropland.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the substratum, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the substratum. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Arnot channery silt loam, 0 to 3 percent slopes, is a phase of the Arnot series.

Some map units are made up of two or more major soils. These map units are called soil complexes or undifferentiated groups.

A *soil complex* consists of two or more soils, or one or more soils and a miscellaneous area, in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Arnot-Lordstown channery silt loams, rolling, is an example.

An *undifferentiated group* is made up of two or more soils that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils in the mapped areas are not uniform. An area can be made up of only one of the major soils, or it can be made up of all of them. Hudson and Vergennes soils, 3 to 8 percent slopes, is an undifferentiated group in this survey area.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Pits, quarry, is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The "Glossary" defines many of the terms used in describing the soils.

Soil Descriptions

Ad—Alden silt loam. This soil is very deep, nearly level, and poorly drained and very poorly drained. It is in low depressions and the headwater areas of streams on till plains. It formed in glacial till. Slopes range from 0 to 3 percent. Areas are irregular in shape and range from 5 to 40 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 9 inches, very dark grayish brown silt loam

Subsoil:

9 to 14 inches, dark grayish brown silt loam that

has light yellowish brown mottles
14 to 24 inches, grayish brown channery silt loam that has yellowish brown mottles
24 to 35 inches, grayish brown silt loam that has yellowish brown mottles

Substratum:
35 to 60 inches, grayish brown channery silt loam that has brownish yellow mottles

Inclusions.—Included with this soil in mapping are small areas of Canandaigua and Madalin soils. Also included, near the center of some depressions, are areas of Carlisle soils. Included areas are as much as 3 acres each in size and make up about 25 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer, moderately slow in the subsoil, and slow in the substratum
Available water capacity: High
Soil reaction: Strongly acid to neutral in the surface layer, moderately acid to neutral in the subsoil, and slightly acid to moderately alkaline in the substratum
Seasonal high water table: 1 foot above to 6 inches below the surface (November through June)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Ponded
Erosion hazard: None or slight

Use.—Most areas of this soil are used as woodland. Some areas are used for pasture or cultivated crops.

Crops and pasture.—This soil is poorly suited to cultivated crops because of wetness. A combination of surface ditches and subsurface drains will reduce the wetness where suitable outlets are available, but periodic wetness commonly is a limitation even if a drainage system is installed.

This soil is only moderately suited to pasture because of the wetness. A drainage system is needed. Deferment of grazing during wet periods, proper stocking rates, and weed control will increase forage yields.

Woodland.—The potential productivity of this soil for red maple is moderate. The seasonal high water table causes severe seedling mortality. It also causes severe windthrow because much of the root growth is restricted to the surface layer. The seasonal wetness makes the soil soft and unable to support heavy equipment.

Dwellings and local roads and streets.—Prolonged periods of wetness and ponding are the main limitations. Extensive alterations are needed to make the soil a suitable site for dwellings. A drainage system and fill material will improve the suitability for local roads and streets.

Septic tank absorption fields.—The major limitations are the wetness, the ponding, and the restricted permeability.

Capability classification.—IVw

Am—Alden silt loam, very stony. This soil is very deep, nearly level, and poorly drained and very poorly drained. It is in low depressions and the headwater areas of streams on till plains. It formed in glacial till. Stones as much as 24 inches in diameter cover as much as 3 percent of the surface. Slopes range from 0 to 3 percent. Areas are irregular in shape and range from 5 to 40 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 9 inches, very dark grayish brown silt loam

Subsoil:
9 to 14 inches, dark grayish brown silt loam that has light yellowish brown mottles
14 to 24 inches, grayish brown channery silt loam that has yellowish brown mottles
24 to 35 inches, grayish brown silt loam that has yellowish brown mottles

Substratum:
35 to 60 inches, grayish brown channery silt loam that has brownish yellow mottles

Inclusions.—Included with this soil in mapping are small areas of the somewhat poorly drained Burdett and Volusia soils at slightly higher elevations. Also included are areas of the poorly drained and very poorly drained soils, Carlisle soils, and soils that have fewer or more stones on the surface than the Alden soil. Included areas are as much as 3 acres each in size and make up about 15 to 25 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer, moderately slow in the subsoil, and slow in the substratum
Available water capacity: High
Soil reaction: Strongly acid to neutral in the surface layer, moderately acid to neutral in the subsoil, and slightly acid to moderately alkaline in the substratum
Seasonal high water table: 1 foot above to 6 inches below the surface (November through June)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Ponded
Erosion hazard: None or slight

Use.—Most areas of this soil are used as woodland. Some areas are used as pasture.

Crops and pasture.—This soil is generally unsuited to cultivated crops and pasture. Wetness and the stones on the surface are the major limitations.

Woodland.—The potential productivity of this soil for red maple is moderate. The seasonal high water table and the stones on the surface cause seedling mortality, and the water table causes windthrow because much of the root growth is restricted to the surface layer. The seasonal wetness makes the soil soft and unable to support heavy equipment, and the stones further restrict the use of equipment.

Dwellings and local roads and streets.—Prolonged periods of wetness and ponding are the main limitations. Extensive alterations are needed to make the soil a suitable site for dwellings. A drainage system and fill material will improve the suitability for local roads and streets.

Septic tank absorption fields.—The major limitations are the wetness, the ponding, and the restricted permeability.

Capability classification.—VIIs

ArA—Arnot channery silt loam, 0 to 3 percent slopes. This soil is shallow, nearly level, and somewhat excessively drained to moderately well drained. It is on the plateaus of bedrock-controlled uplands. It formed in acid glacial till derived from sandstone and shale. Areas are broad or irregular in shape and range from 5 to 20 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 1 inch, dark reddish brown channery silt loam that has 34 percent rock fragments
Subsoil:
1 to 12 inches, reddish brown very channery silt loam that has 55 percent rock fragments
Bedrock:
12 inches, weak red, fractured sandstone

Inclusions.—Included with this soil in mapping are small areas of the somewhat poorly drained and poorly drained Tuller soils in shallow depressions and small areas of the moderately deep Lordstown and Oquaga soils on benches. Also included are small areas that have stones or boulders on the surface, areas in the eastern part of the county where the somewhat excessively drained Nassau soils are underlain by folded shale, and areas where bedrock is within a depth of 12 inches. Included areas are as much as 3 acres each in size and make up about 15 to 25 percent of the unit.

Major soil properties—

Permeability: Moderate throughout the profile
Available water capacity: Very low
Soil reaction: Extremely acid to moderately acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 10 to 20 inches
Surface runoff: Slow
Erosion hazard: Slight

Use.—Most areas of this soil are used as woodland. Some areas are used as pasture, and a few areas are used for cultivated crops.

Crops and pasture.—This soil is moderately suited to cultivated crops. The shallowness to bedrock and the very low available water capacity are the main limitations. Crops that mature early in the season when more moisture is available and those that can withstand drought grow better than other crops. Irrigation sometimes is needed during droughty periods. Properly managing crop residue and regularly adding other organic material will conserve soil moisture.

This soil is well suited to pasture, although the shallowness to bedrock and the very low available water capacity are management concerns. Deferment of grazing during droughty periods will help to keep the pasture in good condition. Rotation grazing, proper stocking rates, applications of fertilizer, and weed control will increase forage yields.

Woodland.—The potential productivity of this soil for northern red oak is moderate. Because of the shallowness to bedrock, seedling mortality is severe and the windthrow hazard is moderate.

Dwellings.—The shallowness to bedrock is the main limitation affecting the use of this soil as a site for dwellings, especially those with basements. The bedrock is mainly hard sandstone and, though fractured in places, cannot be easily ripped.

Included areas of the moderately deep Lordstown soils are better sites for dwellings, especially those without basements. Erosion is a hazard during construction. Maintaining the plant cover and using temporary erosion-control structures will reduce this hazard.

Local roads and streets.—The shallowness to bedrock is the main limitation. Planning road locations and grades so that removal of the rock is not needed and adding fill material will minimize this limitation.

Septic tank absorption fields.—The shallowness to bedrock is the main limitation. A poor filtering capacity and contamination of the ground water are additional management concerns.

Capability classification.—IIIs

ArB—Arnot channery silt loam, 3 to 8 percent slopes. This soil is shallow, gently sloping, and somewhat excessively drained to moderately well drained. It is on benches and plateaus on bedrock-controlled uplands. It formed in acid glacial till derived from sandstone and shale. Areas are long and narrow and range from 5 to 20 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 1 inch, dark reddish brown channery silt loam that has 34 percent rock fragments
Subsoil:
1 to 12 inches, reddish brown very channery silt loam that has 55 percent rock fragments
Bedrock:
12 inches, weak red, fractured sandstone

Inclusions.—Included with this soil in mapping are areas of the somewhat poorly drained and poorly drained Tuller soils and the moderately deep Lordstown and Oquaga soils. Tuller soils are in shallow depressions. Oquaga and Lordstown soils are on benches. Also included, in the eastern part of the county, are small areas of Nassau and Farmington soils, which are shallow to folded shale, slate, or limestone. In a few included areas the soil is less than 10 inches deep to bedrock. Included areas are as much as 3 acres each in size and make up about 15 to 25 percent of the unit.

Major soil properties—

Permeability: Moderate throughout the profile
Available water capacity: Very low
Soil reaction: Extremely acid to moderately acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 10 to 20 inches
Surface runoff: Medium
Erosion hazard: Moderate

Use.—Most areas of this soil are used as woodland. Some areas are used as pasture, and a few areas are used for cultivated crops.

Crops and pasture.—This soil is moderately suited to cultivated crops. The shallowness to bedrock and the very low available water capacity are the main limitations. Crops that mature early in the season when more moisture is available and those that can withstand drought grow better than other crops. Irrigation sometimes is needed during droughty periods. Properly managing crop residue and regularly adding other organic material will conserve soil moisture. A system of conservation tillage that leaves crop residue on the surface after planting will help to control erosion.

This soil is well suited to pasture, although the shallowness to bedrock and the very low available water capacity are management concerns and erosion is a hazard if the pasture is overgrazed. Deferment of grazing during droughty periods will help to keep the pasture in good condition. Rotation grazing, proper stocking rates, applications of fertilizer, and weed control will increase forage yields.

Woodland.—The potential productivity of this soil for northern red oak is moderate. Because of the shallowness to bedrock, seedling mortality is severe and the windthrow hazard is moderate.

Dwellings.—The shallowness to bedrock is the main limitation affecting the use of this soil as a site for dwellings, especially those with basements. The bedrock is mainly hard sandstone and, though fractured in places, cannot be easily ripped. Erosion is a hazard during construction. Maintaining the plant cover and using temporary erosion-control structures will reduce this hazard.

Local roads and streets.—The shallowness to bedrock is the main limitation. Planning road locations and grades so that removal of the rock is not needed and adding fill material will minimize this limitation.

Septic tank absorption fields.—The shallowness to bedrock is the main limitation. The common inclusions in the unit also are limited by the depth to bedrock. A poor filtering capacity and contamination of the ground water are additional management concerns.

Capability classification.—IIIe

ArC—Arnot channery silt loam, 8 to 15 percent slopes. This soil is shallow, strongly sloping, and somewhat excessively drained to moderately well drained. It is on the top and sides of benches and plateaus on bedrock-controlled uplands. It formed in acid glacial till derived from sandstone and shale. Areas are long and narrow and range from 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 1 inch, dark reddish brown channery silt loam that has 34 percent rock fragments
Subsoil:
1 to 12 inches, reddish brown very channery silt loam that has 55 percent rock fragments
Bedrock:
12 inches, weak red, fractured sandstone

Inclusions.—Included with this soil in mapping are small areas of exposed bedrock and areas that have

stones and boulders on the surface. Also included are areas of the moderately deep Lordstown and Oquaga soils. Included areas are as much as 3 acres each in size and make up about 15 to 25 percent of the unit.

Major soil properties—

Permeability: Moderate throughout the profile
Available water capacity: Very low
Soil reaction: Extremely acid to moderately acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 10 to 20 inches
Surface runoff: Rapid
Erosion hazard: Severe

Use.—Most areas of this soil are used as woodland. Some areas are used as pasture.

Crops and pasture.—This soil is poorly suited to cultivated crops. The shallowness to bedrock, the very low available water capacity, and the erosion hazard are management concerns. A system of conservation tillage that leaves crop residue on the surface after planting, contour farming, and a crop rotation that includes 1 or more years of close-growing crops will help to control erosion. Crops that mature early in the season when more moisture is available and those that can withstand drought grow better than other crops. Irrigation is needed during droughty periods. Properly managing crop residue and regularly adding other organic material will conserve soil moisture.

This soil is moderately suited to pasture. The shallowness to bedrock, the erosion hazard, and the very low available water capacity are management concerns. Deferment of grazing during droughty periods will help to keep the pasture in good condition and reduce the hazard of erosion. Rotation grazing, proper stocking rates, applications of fertilizer, and weed control will increase forage yields.

Woodland.—The potential productivity of this soil for northern red oak is moderate. Because of the shallowness to bedrock, seedling mortality is severe and the windthrow hazard is moderate.

Dwellings.—The shallowness to bedrock is the main limitation affecting the use of this soil as a site for dwellings, especially those with basements. The bedrock is mainly hard sandstone and, though fractured in places, cannot be easily ripped.

Included areas of the moderately deep Lordstown soils are better sites for dwellings, especially those without basements. Erosion is a hazard during construction. Maintaining the plant cover and using temporary erosion-control structures will reduce this hazard.

Local roads and streets.—The shallowness to bedrock is the main limitation. Planning road locations and grades so that removal of the rock is not needed and adding fill material will minimize this limitation.

Septic tank absorption fields.—The shallowness to bedrock is the main limitation. The common inclusions in the unit also are limited by the depth to bedrock. A poor filtering capacity and contamination of the ground water are additional management concerns.

Capability classification.—IVe

AsC—Arnot-Lordstown channery silt loams, rolling. This unit consists of soils in areas where the topography is influenced by the underlying bedrock. These soils formed in glacial till derived from interbedded sandstone and shale. Slopes range from 5 to 16 percent. Areas are broad and irregular in shape and range from 5 to 250 acres in size. They are about 45 percent shallow, somewhat excessively drained to moderately well drained Arnot soil; 35 percent moderately deep, well drained Lordstown soil; and 20 percent other soils. These soils are in such an intricate pattern that it was not practical to separate them in mapping.

The typical sequence, depth, and composition of the layers of the Arnot soil are as follows—

Surface layer:
0 to 1 inch, dark reddish brown channery silt loam that has 34 percent rock fragments
Subsoil:
1 to 12 inches, reddish brown very channery silt loam that has 55 percent rock fragments
Bedrock:
12 inches, weak red, fractured sandstone

The typical sequence, depth, and composition of the layers of the Lordstown soil are as follows—

Surface layer:
0 to 5 inches, dark brown channery silt loam that has 30 percent rock fragments
Subsoil:
5 to 11 inches, dark yellowish brown channery silt loam that has 25 percent rock fragments
11 to 21 inches, yellowish brown channery silt loam that has 30 percent rock fragments
21 to 26 inches, light olive brown channery silt loam that has 30 percent rock fragments
Bedrock:
26 inches, gray, fractured sandstone

Inclusions.—Included in this unit in mapping are small areas of exposed bedrock. Also included are small areas of the very deep, well drained Valois soils; the shallow, somewhat poorly drained and poorly drained

Tuller soils; extremely stony and very stony soils; and the shallow, excessively drained Nassau soils near the Hudson River. Included areas are as much as 3 acres each in size.

Major properties of the Arnot soil—

Permeability: Moderate throughout the profile
Available water capacity: Very low
Soil reaction: Extremely acid to moderately acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 10 to 20 inches
Surface runoff: Rapid
Erosion hazard: Severe

Major properties of the Lordstown soil—

Permeability: Moderate throughout the profile
Available water capacity: Low
Soil reaction: Very strongly acid to slightly acid in the surface layer and very strongly acid to moderately acid in the subsoil
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 20 to 40 inches
Surface runoff: Rapid
Erosion hazard: Severe

Use.—Most areas of this unit are used as pasture or meadow. Some areas are used as woodland.

Crops and pasture.—This unit is poorly suited to cultivated crops. The erosion hazard, the depth to bedrock, and the available water capacity are the major limitations. A system of conservation tillage that leaves crop residue on the surface after planting, contour farming, and a crop rotation that includes 1 or more years of close-growing crops will help to control erosion. Crops that mature early in the season when more moisture is available and those that can withstand drought grow better than other crops. Irrigation is needed during droughty periods. Properly managing crop residue and regularly adding other organic material will conserve soil moisture.

This unit is moderately suited to pasture. The shallowness to bedrock and the very low available water capacity in the Arnot soil are management concerns. Erosion is a hazard, especially if the pasture is overgrazed. Deferment of grazing during droughty periods will help to keep the pasture in good condition and reduce the hazard of erosion. Rotation grazing, proper stocking rates, applications of fertilizer, and weed control will increase forage yields.

Woodland.—The potential productivity of this unit for northern red oak is moderate. Because of the shallowness to bedrock and the available water capacity, seedling mortality is high and the windthrow hazard is moderate on the Arnot soil.

Dwellings, local roads and streets, and septic tank absorption fields.—The depth to bedrock is the main limitation affecting these uses, especially in areas of the Arnot soil. The Lordstown soil is suitable as a site for some dwellings, mainly those without basements. The slope and the potential for frost action are additional limitations on sites for roads and streets. A poor filtering capacity and pollution of the ground water are management concerns in areas used as sites for septic tanks. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites. Special design will help to overcome the slope on sites for roads and streets, and a coarse grained subgrade will reduce the potential for frost action.

Capability classification.—IVe

AsD—Arnot-Lordstown channery silt loams, 15 to 25 percent slopes. This unit consists of moderately steep soils in areas where the topography is influenced by the underlying interbedded sandstone and shale. These soils formed in glacial till derived from interbedded sandstone and shale. Areas are broad and irregular in shape and range from 5 to 200 acres in size. They are about 45 percent shallow, somewhat excessively drained to moderately well drained Arnot soil; 35 percent moderately deep, well drained Lordstown soil; and 20 percent other soils. These soils are in such an intricate pattern that it was not practical to separate them in mapping.

The typical sequence, depth, and composition of the layers of the Arnot soil are as follows—

Surface layer:
0 to 1 inch, dark reddish brown channery silt loam that has 34 percent rock fragments
Subsoil:
1 to 12 inches, reddish brown very channery silt loam that has 55 percent rock fragments
Bedrock:
12 inches, weak red, fractured sandstone

The typical sequence, depth, and composition of the layers of the Lordstown soil are as follows—

Surface layer:
0 to 5 inches, dark brown channery silt loam that has 30 percent rock fragments
Subsoil:
5 to 11 inches, dark yellowish brown channery silt loam that has 25 percent rock fragments
11 to 21 inches, yellowish brown channery silt loam

that has 30 percent rock fragments
21 to 26 inches, light olive brown channery silt loam that has 30 percent rock fragments

Bedrock:
26 inches, gray, fractured sandstone

Inclusions.—Included in this unit in mapping are small ledges and bedrock outcrops. Also included are areas of the somewhat poorly drained and poorly drained Tuller soils in shallow depressions, soils that have stones and boulders on the surface, the very deep Valois and Mardin soils on hills, and Nassau and Farmington soils near the Hudson River. Included areas are as much as 3 acres each in size.

Major properties of the Arnot soil—

Permeability: Moderate throughout the profile
Available water capacity: Very low
Soil reaction: Extremely acid to moderately acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 10 to 20 inches
Surface runoff: Very rapid
Erosion hazard: Very severe

Major properties of the Lordstown soil—

Permeability: Moderate throughout the profile
Available water capacity: Low
Soil reaction: Very strongly acid to slightly acid in the surface layer and very strongly acid to moderately acid in the subsoil
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 20 to 40 inches
Surface runoff: Very rapid
Erosion hazard: Very severe

Use.—Many areas of this unit are used as pasture or meadow. Some areas are used as woodland.

Crops and pasture.—This unit is generally unsuited to cultivated crops because of the slope and the very severe hazard of erosion. The shallowness to bedrock and the very low available water capacity are additional limitations in the Arnot soil.

This unit is better suited to pasture than to cultivated crops, although the suitability is only poor. The limitations are the same as those that affect cultivated crops. Deferment of grazing during droughty periods will help to keep the pasture in good condition and reduce the hazard of erosion. Rotation grazing, proper stocking rates, applications of fertilizer, and weed control will increase forage yields.

Woodland.—The potential productivity of this unit for northern red oak is moderate. Because of the depth to bedrock and the available water capacity, seedling mortality is severe and the windthrow hazard is moderate on the Arnot soil. The slope limits the use of equipment throughout the unit.

Dwellings.—The depth to bedrock and the slope are the main limitations. The depth to bedrock is a major limitation of the Arnot soil, especially on sites for dwellings with basements. Dwellings without basements can be constructed above the bedrock, and special design can be used to overcome the slope. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—The main limitations are the shallowness to bedrock in the Arnot soil and the slope. Planning road locations will help to avoid the bedrock. Special design and grading will help to overcome the slope.

Septic tank absorption fields.—The depth to bedrock and the slope are the main limitations. A poor filtering capacity and contamination of the ground water are management concerns.

Capability classification.—VIe.

AsE—Arnot-Lordstown channery silt loams, 25 to 45 percent slopes. This unit consists of steep soils in areas where the topography is influenced by the underlying interbedded sandstone and shale. These soils formed in glacial till derived from interbedded sandstone and shale. Areas are long and irregular in shape and range from 3 to 25 acres in size. They are about 45 percent shallow, somewhat excessively drained to moderately well drained Arnot soil; 35 percent moderately deep, well drained Lordstown soil; and 20 percent other soils. These soils are in such an intricate pattern that it was not practical to separate them in mapping.

The typical sequence, depth, and composition of the layers of the Arnot soil are as follows—

Surface layer:
0 to 1 inch, dark reddish brown channery silt loam that has 34 percent rock fragments

Subsoil:
1 to 12 inches, reddish brown very channery silt loam that has 55 percent rock fragments

Bedrock:
12 inches, weak red, fractured sandstone

The typical sequence, depth, and composition of the layers of the Lordstown soil are as follows—

Surface layer:
0 to 5 inches, dark brown channery silt loam that

has 30 percent rock fragments

Subsoil:

5 to 11 inches, dark yellowish brown channery silt loam that has 25 percent rock fragments

11 to 21 inches, yellowish brown channery silt loam that has 30 percent rock fragments

21 to 26 inches, light olive brown channery silt loam that has 30 percent rock fragments

Bedrock:

26 inches, gray, fractured sandstone

Inclusions.—Included in this unit in mapping are small ledges and bedrock outcrops. Also included are areas that have stones and boulders on the surface and the very deep Valois and Mardin soils at the top of hills. Included areas are as much as 3 acres each in size.

Major properties of the Arnot soil—

Permeability: Moderate throughout the profile
Available water capacity: Very low
Soil reaction: Extremely acid to moderately acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 10 to 20 inches
Surface runoff: Very rapid
Erosion hazard: Very severe

Major properties of the Lordstown soil—

Permeability: Moderate throughout the profile
Available water capacity: Low
Soil reaction: Very strongly acid to slightly acid in the surface layer and very strongly acid to moderately acid in the subsoil
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 20 to 40 inches
Surface runoff: Very rapid
Erosion hazard: Very severe

Use.—Most areas of this unit are native forest. Some areas are idle.

Crops and pasture.—This unit is generally unsuited to cultivated crops and pasture because of the slope and the very severe hazard of erosion. In the Arnot soil, the shallowness to bedrock and the very low available water capacity also are limitations.

Woodland.—The potential productivity of this unit for northern red oak is moderate. Seedling mortality is high on the Arnot soil because of the shallowness to bedrock and the very low available water capacity. Windthrow is a hazard because the bedrock limits the rooting depth. The slope limits the use of equipment.

Dwellings.—The depth to bedrock and the slope are the main limitations. The depth to bedrock is a major limitation of the Arnot soil, especially on sites for dwellings with basements.

Local roads and streets.—The main limitations are the depth to bedrock in the Arnot soil and the slope. Planning road locations will help to avoid the bedrock. Special design and grading will help to overcome the slope.

Septic tank absorption fields.—The depth to bedrock and the slope are the main limitations. A poor filtering capacity and contamination of the ground water are management concerns.

Capability classification.—VIIs

AuC—Arnot-Lordstown channery silt loams, 3 to 15 percent slopes, rocky. This unit consists of strongly sloping soils in areas where the topography is influenced by the underlying interbedded sandstone and shale. These soils are mainly in the foothills of the Catskill Mountains, in the eastern part of the county. The soils formed in glacial till derived from interbedded sandstone and shale. Exposed bedrock and ledges cover about 2 percent of the surface. Areas are broad and irregular in shape and range from 5 to 250 acres in size. They are about 45 percent shallow, somewhat excessively drained to moderately well drained Arnot soil; 25 percent moderately deep, well drained Lordstown soil; and 30 percent other soils. These soils are in such an intricate pattern that it was not practical to separate them in mapping.

The typical sequence, depth, and composition of the layers of the Arnot soil are as follows—

Surface layer:

0 to 1 inch, dark reddish brown channery silt loam that has 34 percent rock fragments

Subsoil:

1 to 12 inches, reddish brown very channery silt loam that has 55 percent rock fragments

Bedrock:

12 inches, weak red, fractured sandstone

The typical sequence, depth, and composition of the layers of the Lordstown soil are as follows—

Surface layer:

0 to 5 inches, dark brown channery silt loam that has 30 percent rock fragments

Subsoil:

5 to 11 inches, dark yellowish brown channery silt loam that has 25 percent rock fragments

11 to 21 inches, yellowish brown channery silt loam that has 30 percent rock fragments

21 to 26 inches, light olive brown channery silt loam that has 30 percent rock fragments

Bedrock:
26 inches, gray, fractured sandstone

Inclusions.—Included in this unit in mapping are small areas of the somewhat poorly drained and poorly drained Tuller soils in shallow depressions. Also included are areas of quarry rubble and areas that have stones and boulders on the surface. Included areas are as much as 3 acres each in size.

Major properties of the Arnot soil—

Permeability: Moderate throughout the profile
Available water capacity: Very low
Soil reaction: Extremely acid to moderately acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 10 to 20 inches
Surface runoff: Rapid
Erosion hazard: Severe

Major properties of the Lordstown soil—

Permeability: Moderate throughout the profile
Available water capacity: Low
Soil reaction: Very strongly acid to slightly acid in the surface layer and very strongly acid to moderately acid in the subsoil
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 20 to 40 inches
Surface runoff: Rapid
Erosion hazard: Severe

Use.—Most areas of this unit are used as woodland. Some areas are used for recreation, mainly as camping areas or as sites for vacation homes.

Crops and pasture.—This unit is generally unsuited to cultivated crops and pasture because of the slope, the erosion hazard, and the available water capacity and shallowness to bedrock in the Arnot soil.

Woodland.—The potential productivity of this unit for northern red oak is moderate. Seedling mortality is high on the Arnot soil because of the shallowness to bedrock and the very low available water capacity. Windthrow is a hazard because the bedrock limits the rooting depth.

Dwellings.—The depth to bedrock is the main limitation in the Arnot soil, especially on sites for dwellings with basements. Constructing above the bedrock and adding fill material will help to overcome this limitation. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—The main limitations are the depth to bedrock in the Arnot soil and the slope. Planning road locations will help to avoid the bedrock. Special design and grading will help to overcome the slope.

Septic tank absorption fields.—The depth to bedrock is the main limitation. A poor filtering capacity and contamination of the ground water are management concerns.

Capability classification.—VIs

AvD—Arnot-Lordstown channery silt loams, 15 to 35 percent slopes, very rocky. This unit consists of moderately steep soils in areas where the topography is influenced by the underlying interbedded sandstone and shale. These soils are mainly in the foothills of the Catskill Mountains, in the eastern part of the county. The soils formed in glacial till derived from interbedded sandstone and shale. Exposed bedrock and ledges cover about 2 to 10 percent of the surface. Areas are broad and irregular in shape and range from 5 to 350 acres in size. They are about 45 percent shallow, somewhat excessively drained to moderately well drained Arnot soil; 25 percent moderately deep, well drained Lordstown soil; and 30 percent other soils. These soils are in such an intricate pattern that it was not practical to separate them in mapping.

The typical sequence, depth, and composition of the layers of the Arnot soil are as follows—

Surface layer:
0 to 1 inch, dark reddish brown channery silt loam that has 34 percent rock fragments
Subsoil:
1 to 12 inches, reddish brown very channery silt loam that has 55 percent rock fragments
Bedrock:
12 inches, weak red, fractured sandstone

The typical sequence, depth, and composition of the layers of the Lordstown soil are as follows—

Surface layer:
0 to 5 inches, dark brown channery silt loam that has 30 percent rock fragments
Subsoil:
5 to 11 inches, dark yellowish brown channery silt loam that has 25 percent rock fragments
11 to 21 inches, yellowish brown channery silt loam that has 30 percent rock fragments
21 to 26 inches, light olive brown channery silt loam that has 30 percent rock fragments
Bedrock:
26 inches, gray, fractured sandstone

Inclusions.—Included in this unit in mapping are small areas of the somewhat poorly drained and poorly drained Tuller and very poorly drained Carlisle soils in

shallow depressions. Also included are areas of quarry rubble and areas that have stones and boulders on the surface. Included areas are as much as 3 acres each in size.

Major properties of the Arnot soil—

Permeability: Moderate throughout the profile
Available water capacity: Very low
Soil reaction: Extremely acid to moderately acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 10 to 20 inches
Surface runoff: Very rapid
Erosion hazard: Very severe

Major properties of the Lordstown soil—

Permeability: Moderate throughout the profile
Available water capacity: Low
Soil reaction: Very strongly acid to slightly acid in the surface layer and very strongly acid to moderately acid in the subsoil
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 20 to 40 inches
Surface runoff: Very rapid
Erosion hazard: Very severe

Use.—Most areas of this unit are used as woodland. Some areas are used for recreational purposes, mainly as camping areas or as sites for vacation homes.

Crops and pasture.—This unit is generally unsuited to cultivated crops and pasture because of the slope, the erosion hazard, and the available water capacity and shallowness to bedrock in the Arnot soil.

Woodland.—The potential productivity of this unit for northern red oak is moderate. Seedling mortality is high on the Arnot soil because of the shallowness to bedrock and the very low available water capacity. Windthrow is a hazard because the bedrock limits the rooting depth. The slope limits the use of equipment.

Dwellings.—The depth to bedrock and the slope are the main limitations. The depth to bedrock is a major limitation of the Arnot soil, especially on sites for dwellings with basements. Constructing above the bedrock and adding fill material will help to overcome the depth to bedrock. Special design will help to overcome the slope. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—The main limitations are the depth to bedrock in the Arnot soil and the slope. Planning road locations and grades in areas of the Lordstown soil will help to avoid the bedrock. Special design and grading will help to overcome the slope.

Septic tank absorption fields.—The depth to bedrock and the slope are the main limitations. A poor filtering capacity and contamination of the ground water are management concerns.

Capability classification.—VIIs

AvF—Arnot-Lordstown channery silt loams, 35 to 55 percent slopes, very rocky. This unit consists of very steep soils in areas where the topography is influenced by the underlying interbedded sandstone and shale. These soils are mainly in the foothills of the Catskill Mountains, in the eastern part of the county. The soils formed in glacial till derived from interbedded sandstone and shale. Exposed bedrock and ledges cover about 2 to 10 percent of the surface. Areas are long and narrow and range from 5 to 150 acres in size. They are about 50 percent shallow, somewhat excessively drained to moderately well drained Arnot soil; 20 percent moderately deep, well drained Lordstown soil; and 20 percent other soils. These soils are in such an intricate pattern that it was not practical to separate them in mapping.

The typical sequence, depth, and composition of the layers of the Arnot soil are as follows—

Surface layer:
0 to 1 inch, dark reddish brown channery silt loam that has 34 percent rock fragments
Subsoil:
1 to 12 inches, reddish brown very channery silt loam that has 55 percent rock fragments
Bedrock:
12 inches, weak red, fractured sandstone

The typical sequence, depth, and composition of the layers of the Lordstown soil are as follows—

Surface layer:
0 to 5 inches, dark brown channery silt loam that has 30 percent rock fragments
Subsoil:
5 to 11 inches, dark yellowish brown channery silt loam that has 25 percent rock fragments
11 to 21 inches, yellowish brown channery silt loam that has 30 percent rock fragments
21 to 26 inches, light olive brown channery silt loam that has 30 percent rock fragments
Bedrock:
26 inches, gray, fractured sandstone

Inclusions.—Included in this unit in mapping are small areas of the somewhat poorly drained and poorly drained Tuller soils in shallow depressions. Also included are areas of quarry rubble and areas that have stones and boulders on the surface. Included areas are

as much as 3 acres each in size.

Major properties of the Arnot soil—

Permeability: Moderate throughout the profile
Available water capacity: Very low
Soil reaction: Extremely acid to moderately acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 10 to 20 inches
Surface runoff: Very rapid
Erosion hazard: Very severe

Major properties of the Lordstown soil—

Permeability: Moderate throughout the profile
Available water capacity: Low
Soil reaction: Very strongly acid to slightly acid in the surface layer and very strongly acid to moderately acid in the subsoil
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 20 to 40 inches
Surface runoff: Very rapid
Erosion hazard: Very severe

Use.—Most areas of this unit are used as woodland.

Crops and pasture.—This unit is generally unsuited to cultivated crops and pasture because of the slope, the erosion hazard, and the available water capacity and shallowness to bedrock in the Arnot soil.

Woodland.—The potential productivity of this unit for northern red oak is moderate. Seedling mortality is high on the Arnot soil because of the shallowness to bedrock and the very low available water capacity. Windthrow is a hazard because the bedrock limits the rooting depth. The slope limits the use of equipment.

Dwellings.—The depth to bedrock and the slope are the main limitations. The depth to bedrock is a major limitation of the Arnot soil, especially on sites for dwellings with basements.

Local roads and streets.—The main limitations are the depth to bedrock in the Arnot soil and the slope. Planning road locations will help to avoid the bedrock. Special design and grading will help to overcome the slope.

Septic tank absorption fields.—The depth to bedrock and the slope are the main limitations. A poor filtering capacity and contamination of the ground water are management concerns.

Capability classification.—VIIs

AwC—Arnot-Oquaga complex, rolling. This unit consists of soils on a bedrock-controlled topography of eroded, rounded hills, mainly in the foothills of the Catskill Mountains. These soils formed in glacial till derived from interbedded sandstone and shale. Slopes range from 5 to 16 percent. Areas are broad and irregularly shaped and range from 5 to 300 acres in size. They are about 45 percent shallow, somewhat excessively drained to moderately well drained Arnot soil; 35 percent moderately deep, well drained and somewhat excessively drained Oquaga soil; and 20 percent other soils. These soils are in such an intricate pattern that it was not practical to separate them in mapping.

The typical sequence, depth, and composition of the layers of the Arnot soil are as follows—

Surface layer:
0 to 1 inch, dark reddish brown channery silt loam that has 34 percent rock fragments
Subsoil:
1 to 12 inches, reddish brown very channery silt loam that has 55 percent rock fragments
Bedrock:
12 inches, weak red, fractured sandstone

The typical sequence, depth, and composition of the layers of the Oquaga soil are as follows—

Surface layer:
0 to 8 inches, dark brown very channery silt loam that has 35 percent rock fragments
Subsoil:
8 to 15 inches, reddish brown very channery silt loam that has 40 percent rock fragments
15 to 22 inches, yellowish red very channery silt loam that has 40 percent rock fragments
Bedrock:
22 inches, red and gray, massive sandstone

Inclusions.—Included in this unit in mapping are small areas of the somewhat poorly drained and poorly drained Tuller soils in shallow depressions. Also included are areas of the very deep Lackawanna and Wellsboro soils at the top of hills, small areas of exposed bedrock and ledges, and small areas that have a stony or bouldery surface. Included areas are as much as 3 acres each in size.

Major properties of the Arnot soil—

Permeability: Moderate throughout the profile
Available water capacity: Very low
Soil reaction: Extremely acid to moderately acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 10 to 20 inches
Surface runoff: Rapid
Erosion hazard: Severe

Major properties of the Oquaga soil—

Permeability: Moderate throughout the profile
Available water capacity: Low
Soil reaction: Extremely acid to moderately acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 20 to 40 inches
Surface runoff: Rapid
Erosion hazard: Severe

Use.—Most areas of this unit are used as pasture or meadow. Some areas are used as woodland.

Crops and pasture.—This unit is poorly suited to cultivated crops because of the erosion hazard, the depth to bedrock, and the available water capacity. A conservation tillage system that leaves crop residue on the surface after planting and a crop rotation that includes several years of close-growing crops will help to control erosion. Contour farming and stripcropping also will help to control erosion in areas where slopes are fairly uniform. Properly managing crop residue and regularly adding other organic material will conserve soil moisture.

This unit is moderately suited to pasture but has the same limitations as those that affect cultivated crops. Deferment of grazing during dry periods will help to control erosion and improve the growth of forage species. Proper stocking rates, rotation grazing, applications of fertilizer, and weed control will help to keep the pasture in good condition.

Woodland.—The potential productivity for northern red oak is moderate on the Arnot soil and moderately high on the Oquaga soil. Seedling mortality is severe on the Arnot soil because of the shallowness to bedrock and the available water capacity. The depth to bedrock also causes a windthrow hazard on the Arnot soil. Few or no limitations affect woodland management on the Oquaga soil.

Dwellings.—The shallowness to bedrock in the Arnot soil and the moderate depth in the Oquaga soil are the main limitations. Building above the bedrock and adding fill material will help to overcome this limitation. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on building sites.

Local roads and streets.—The depth to bedrock in the Arnot soil is the main limitation. The slope, the potential for frost action, and the depth to bedrock are additional but less severe limitations in areas of the Oquaga soil. Planning road locations on the Oquaga soil will help to avoid the bedrock, and special design helps to overcome the slope.

Septic tank absorption fields.—The depth to bedrock is the main limitation. A poor filtering capacity is common, and contamination of the ground water is a hazard.

Capability classification.—IVe

AwD—Arnot-Oquaga complex, 15 to 25 percent slopes. This unit consists of soils on a bedrock-controlled topography of eroded, moderately steep hills, mainly in the foothills of the Catskill Mountains, in the eastern part of the county. These soils formed in glacial till derived from interbedded sandstone and shale. Areas are long and irregularly shaped and range from 5 to 100 acres in size. They are about 45 percent shallow, somewhat excessively drained to moderately well drained Arnot soil; 35 percent moderately deep, well drained and somewhat excessively drained Oquaga soil; and 20 percent other soils. These soils are in such an intricate pattern that it was not practical to separate them in mapping.

The typical sequence, depth, and composition of the layers of the Arnot soil are as follows—

Surface layer:
0 to 1 inch, dark reddish brown channery silt loam that has 34 percent rock fragments
Subsoil:
1 to 12 inches, reddish brown very channery silt loam that has 55 percent rock fragments
Bedrock:
12 inches, weak red, fractured sandstone

The typical sequence, depth, and composition of the layers of the Oquaga soil are as follows—

Surface layer:
0 to 8 inches, dark brown very channery silt loam that has 35 percent rock fragments
Subsoil:
8 to 15 inches, reddish brown very channery silt loam that has 40 percent rock fragments
15 to 22 inches, yellowish red very channery silt loam that has 40 percent rock fragments
Bedrock:
22 inches, red and gray, massive sandstone

Inclusions.—Included in this unit in mapping are small areas of the very deep Lackawanna and Wellsboro soils at the top of hills, small areas of exposed bedrock and ledges, and small areas that have a very stony or bouldery surface. Included areas are as much as 3 acres each in size.

Major properties of the Arnot soil—

Permeability: Moderate throughout the profile
Available water capacity: Very low

Soil reaction: Extremely acid to moderately acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 10 to 20 inches
Surface runoff: Very rapid
Erosion hazard: Very severe

Major properties of the Oquaga soil—

Permeability: Moderate throughout the profile
Available water capacity: Low
Soil reaction: Extremely acid to moderately acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 20 to 40 inches
Surface runoff: Very rapid
Erosion hazard: Very severe

Use.—Most areas of this unit are used as pasture or meadow. Some areas are used as woodland.

Crops and pasture.—This unit is generally unsuited to cultivated crops because of the erosion hazard, the depth to bedrock, the slope, and the available water capacity. It is better suited to pasture but has the same limitations as those that affect cultivated crops. Deferment of grazing during dry periods will help to control erosion and improve the growth of forage species. Proper stocking rates, rotation grazing, applications of fertilizer, and weed control will help to keep the pasture in good condition.

Woodland.—The potential productivity for northern red oak is moderate on the Arnot soil and moderately high on the Oquaga soil. Seedling mortality is severe on the Arnot soil because of the shallowness to bedrock and the available water capacity. The depth to bedrock also causes a windthrow hazard on the Arnot soil. The slope limits the use of equipment.

Dwellings.—The shallowness to bedrock in the Arnot soil, the moderate depth to bedrock in the Oquaga soil, and the slope of both soils are the main limitations. Building above the bedrock and adding fill material will help to overcome the depth to bedrock. Special design will help to overcome the slope. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on building sites.

Local roads and streets.—The depth to bedrock in the Arnot soil and the slope of both soils are the main limitations. Planning road locations on the Oquaga soil will help to avoid the bedrock, and special design helps to overcome the slope.

Septic tank absorption fields.—The depth to bedrock and the slope are the main limitations. A poor filtering capacity is common, and contamination of the ground water is a hazard.

Capability classification.—VIe

AwE—Arnot-Oquaga complex, 25 to 45 percent slopes. This unit consists of soils on a bedrock-controlled topography of steep, eroded hills, mainly in the foothills of the Catskill Mountains. These soils formed in glacial till derived from interbedded sandstone and shale. Areas are long and irregularly shaped and range from 5 to 70 acres in size. They are about 45 percent shallow, somewhat excessively drained to moderately well drained Arnot soil; 35 percent moderately deep, well drained and somewhat excessively drained Oquaga soil; and 20 percent other soils. These soils are in such an intricate pattern that it was not practical to separate them in mapping.

The typical sequence, depth, and composition of the layers of the Arnot soil are as follows—

Surface layer:
0 to 1 inch, dark reddish brown channery silt loam that has 34 percent rock fragments
Subsoil:
1 to 12 inches, reddish brown very channery silt loam that has 55 percent rock fragments
Bedrock:
12 inches, weak red, fractured sandstone

The typical sequence, depth, and composition of the layers of the Oquaga soil are as follows—

Surface layer:
0 to 8 inches, dark brown very channery silt loam that has 35 percent rock fragments
Subsoil:
8 to 15 inches, reddish brown very channery silt loam that has 40 percent rock fragments
15 to 22 inches, yellowish red very channery silt loam that has 40 percent rock fragments
Bedrock:
22 inches, red and gray, massive sandstone

Inclusions.—Included in this unit in mapping are small areas of the very deep Lackawanna, Valois, and Wellsboro soils at the top of hills. Also included are small areas of exposed bedrock and ledges and small areas that have a very stony or bouldery surface. Included areas are as much as 3 acres each in size.

Major properties of the Arnot soil—

Permeability: Moderate throughout the profile
Available water capacity: Very low
Soil reaction: Extremely acid to moderately acid throughout the profile

Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 10 to 20 inches
Surface runoff: Very rapid
Erosion hazard: Very severe

Major properties of the Oquaga soil—

Permeability: Moderate throughout the profile
Available water capacity: Low
Soil reaction: Extremely acid to moderately acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 20 to 40 inches
Surface runoff: Very rapid
Erosion hazard: Very severe

Use.—Most areas of this unit are used as woodland.

Crops and pasture.—This unit is generally unsuited to cultivated crops and pasture because of the erosion hazard, the depth to bedrock, the slope, and the available water capacity.

Woodland.—The potential productivity of this unit for northern red oak is moderate. Seedling mortality is severe on the Arnot soil because of the shallowness to bedrock and the available water capacity. The depth to bedrock also causes a windthrow hazard on the Arnot soil. The slope limits the use of equipment.

Dwellings.—The depth to bedrock, especially in the Arnot soil, and the slope of both soils are the main limitations.

Local roads and streets.—The depth to bedrock in the Arnot soil and the slope of both soils are the main limitations. Planning road locations on the Oquaga soil will help to avoid the bedrock, and special design helps to overcome the slope.

Septic tank absorption fields.—The depth to bedrock and the slope are the main limitations. A poor filtering capacity is common, and contamination of the ground water is a hazard.

Capability classification.—VIIe

Ba—Barbour loam. This soil is very deep, nearly level, and well drained. It is on flood plains along the larger streams. It formed in alluvial deposits. Slopes range from 0 to 3 percent. Areas are long and narrow and range from 3 to 100 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 9 inches, dark reddish brown loam
Subsoil:
9 to 15 inches, yellowish red loam
15 to 23 inches, dark reddish brown fine sandy loam
23 to 28 inches, dark reddish brown and reddish brown fine sandy loam
Substratum:
28 to 37 inches, dark reddish brown very gravelly coarse sand that has 44 percent rock fragments
37 to 78 inches, dark reddish brown very gravelly coarse sand that has 58 percent rock fragments

Inclusions.—Included with this soil in mapping are small areas of the gravelly Tunkhannock soils on the higher parts of the landscape and areas of the moderately well drained Basher and poorly drained and very poorly drained Wayland soils on the lower parts of the flood plains. Also included are small areas of soils that are similar to the Barbour soil but have a gravelly or very gravelly surface layer. Included areas are as much as 5 acres each in size and make up 15 to 25 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer, moderately rapid in the subsoil, and rapid in the substratum
Available water capacity: Moderate
Soil reaction: Very strongly acid to moderately acid in the surface layer and subsoil and very strongly acid to slightly acid in the substratum
Depth to the seasonal high water table. 3 to 6 feet (January through April)
Flooding: Occasional and brief (December through April)
Depth to bedrock: More than 60 inches
Surface runoff: Very slow or ponded
Erosion hazard: None

Use.—Most areas are used for cultivated crops. Some areas are used as pasture. This soil is classified as prime farmland.

Crops and pasture.—This soil is well suited to cultivated crops. The flooding generally does not occur during the growing season, but grading is sometimes needed to clear the debris deposited by floodwater and to cover the channels caused by flooding. Properly managing crop residue and regularly adding other organic material will help to maintain tilth and conserve soil moisture.

This soil is well suited to pasture. Deferment of grazing during wet periods, proper stocking rates, rotation grazing, and weed control will increase forage yields.

Woodland.—The potential productivity of this soil for sugar maple is moderate. No major limitations affect woodland management.

Dwellings and local roads and streets.—Flooding is

the main hazard affecting the use of this soil as a site for dwellings with basements and for local roads and streets. Constructing roads on raised fill material will minimize this hazard.

Septic tank absorption fields.—Flooding, wetness, and a poor filtering capacity are the main limitations. The poor filtering capacity and contamination of the ground water are management concerns, especially during periods of flooding.

Capability classification.—I

Bs—Basher silt loam. This soil is very deep, nearly level, and moderately well drained. It is on flood plains along the larger streams in the western part of the county. It formed in alluvial deposits. Slopes range from 0 to 3 percent. Areas are long and narrow and range from 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, dark reddish brown loam
Subsoil:
8 to 14 inches, reddish brown silt loam
14 to 22 inches, reddish brown silt loam that has brown and strong brown mottles
Substratum:
22 to 43 inches, dark reddish brown loam that has reddish gray and strong brown mottles
43 to 60 inches, reddish gray loam that has pinkish gray and brown mottles

Inclusions.—Included with this soil in mapping are small areas of the gravelly Tunkhannock soils on the higher parts of the landscape, areas of gravel and sandbars near the main streams or along intermittent channels and oxbows, areas of the well drained Barbour soils on the higher parts of the flood plains, areas of the poorly drained and very poorly drained Wayland soils in depressions, and areas of soils that are similar to the Basher soil but have stratified sand and gravel in the substratum. Also included are Fluvaquents and Udifluvents adjacent to channels and in scour areas. Included areas are as much as 5 acres each in size and make up 15 to 25 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and subsoil, moderately slow and moderate in the upper part of the substratum, and moderately rapid in the lower part of the substratum
Available water capacity: Moderate
Soil reaction: Extremely acid to moderately acid in the surface layer and subsoil and very strongly acid to slightly acid in the substratum
Depth to the seasonal high water table: 1.5 to 2.0 feet (January through May)
Flooding: Occasional and brief to long (December through April)
Depth to bedrock: More than 60 inches
Surface runoff: Slow
Erosion hazard: None

Use.—Most areas are used for cultivated crops. Some areas are used as pasture. Drained areas of this soil are classified as prime farmland.

Crops and pasture.—This soil is well suited to cultivated crops. Flooding delays planting in some years. Periodic grading is needed to clear some of the debris deposited by floodwater and to cover channels caused by flooding. A subsurface drainage system is needed to reduce wetness. Properly managing crop residue and regularly adding other organic material will help to maintain tilth.

This soil is well suited to pasture. Deferment of grazing during wet periods, proper stocking rates, rotation grazing, and weed control will increase forage yields.

Woodland.—The potential productivity of this soil for sugar maple is moderate. No major limitations affect woodland management.

Dwellings and local roads and streets.—Flooding is the main hazard affecting the use of this soil as a site for dwellings and local roads and streets. Wetness is a limitation on sites for dwellings with basements. The potential for frost action is an additional limitation on sites for local roads and streets. Constructing the roads and streets on raised fill of coarse grained material will help to overcome the flooding and the potential for frost action.

Septic tank absorption fields.—Wetness and flooding are the main limitations. A poor filtering capacity and contamination of the ground water are management concerns, especially during periods of flooding.

Capability classification.—IIw

BuA—Burdett channery silt loam, 0 to 3 percent slopes. This soil is very deep, nearly level, and somewhat poorly drained. It is on the more nearly level parts of glacial till plains. It formed in acid glacial till derived mainly from shale. Areas are long and narrow or irregular in shape and range from 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 9 inches, dark brown channery silt loam that

has 25 percent rock fragments

Subsurface layer:

9 to 15 inches, brown channery silt loam that has dark yellowish brown mottles and 25 percent rock fragments

15 to 20 inches, grayish brown and dark brown channery silt loam that has strong brown and light gray mottles and 20 percent rock fragments

Subsoil:

20 to 36 inches, brown channery clay loam that has yellowish brown and light gray mottles and 20 percent rock fragments

Substratum:

36 to 60 inches, brown channery loam that has yellowish brown and light gray mottles and 20 percent rock fragments

Inclusions.—Included with this soil in mapping are small areas of the poorly drained and very poorly drained Canandaigua and Lyons soils in depressions and drainageways; areas of the shallow, somewhat poorly drained and poorly drained Tuller soils; and areas of soils that are similar to the Burdett soil but are more acid throughout or contain less clay in the subsoil. Also included are areas of Volusia soils. Included areas are as much as 3 acres each in size and make up 15 to 25 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and subsurface layer and slow in the subsoil and substratum

Available water capacity: Moderate

Soil reaction: Strongly acid to neutral in the surface layer, subsurface layer, and subsoil and slightly acid to moderately alkaline in the substratum

Depth to the seasonal high water table: 6 inches to 1.5 feet (December through May)

Flooding: None

Depth to bedrock: More than 60 inches

Surface runoff: Slow

Erosion hazard: None or slight

Use.—Most areas are used as pasture. A few areas are used for cultivated crops. Drained areas of this soil are classified as prime farmland.

Crops and pasture.—This soil is moderately suited to cultivated crops. Wetness is the main limitation. A combination of random subsurface drains and shallow surface ditches will reduce the wetness. Properly managing crop residue and regularly adding other organic material will help to maintain tilth.

This soil is well suited to pasture, although wetness is a limitation. Deferment of grazing during wet periods will help to keep the pasture in good condition. Rotation grazing, proper stocking rates, applications of fertilizer, and weed control will increase forage yields.

Woodland.—The potential productivity of this soil for sugar maple is moderate. Seasonal wetness limits the use of equipment and causes seedling mortality and windthrow.

Dwellings.—Wetness is the main limitation affecting the use of this soil as a site for dwellings with basements. Grading the soil so that surface water moves away from the dwelling and installing interceptor drains to divert water from the higher adjacent areas will reduce the wetness. Installing drains around footings and foundations and sealing the foundations also will reduce the wetness.

Local roads and streets.—Wetness and the potential for frost action are the main limitations. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action. Constructing on raised fill material and installing a drainage system will reduce the wetness.

Septic tank absorption fields.—Wetness and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept runoff from the higher adjacent areas. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which the effluent is absorbed.

Capability classification.—IIIw

BuB—Burdett channery silt loam, 3 to 8 percent slopes. This soil is very deep, gently sloping, and somewhat poorly drained. It is at the top of ridges. It formed in acid glacial till derived mainly from shale. Areas are irregular in shape and range from 5 to 300 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 9 inches, dark brown channery silt loam that has 25 percent rock fragments

Subsurface layer:

9 to 15 inches, brown channery silt loam that has dark yellowish brown mottles and 25 percent rock fragments

15 to 20 inches, grayish brown and dark brown channery silt loam that has strong brown and light gray mottles and 20 percent rock fragments

Subsoil:

20 to 36 inches, brown channery clay loam that has yellowish brown and light gray mottles and 20 percent rock fragments

Substratum:
36 to 60 inches, brown channery loam that has yellowish brown and light gray mottles and 20 percent rock fragments

Inclusions.—Included with this soil in mapping are small areas of the poorly drained and very poorly drained Canandaigua and Lyons soils in depressions and drainageways; areas of the shallow, somewhat poorly drained and poorly drained Tuller soils; and areas of soils that are similar to the Burdett soil but are more acid throughout or contain less clay in the subsoil. Also included are areas of Volusia soils. Included areas are as much as 3 acres each in size and make up 15 to 25 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and subsurface layer and slow in the subsoil and substratum
Available water capacity: Moderate
Soil reaction: Strongly acid to neutral in the surface layer, subsurface layer, and subsoil and slightly acid to moderately alkaline in the substratum
Depth to the seasonal high water table: 6 inches to 1.5 feet (December through May)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Medium
Erosion hazard: Slight

Use.—Most areas of this soil are used as pasture. A few areas are used for cultivated crops.

Crops and pasture.—This soil is moderately suited to cultivated crops. Wetness is the main limitation. A combination of random subsurface drains and shallow surface ditches will reduce the wetness. A conservation tillage system that leaves crop residue on the surface will help to control erosion. Properly managing crop residue and regularly adding other organic material will help to maintain tilth.

This soil is well suited to pasture, although wetness is a limitation. Deferment of grazing during wet periods will help to keep the pasture in good condition. Rotation grazing, proper stocking rates, applications of fertilizer, and weed control will increase forage yields.

Woodland.—The potential productivity of this soil for sugar maple is moderate. Seasonal wetness limits the use of equipment and causes seedling mortality and windthrow.

Dwellings.—Wetness is the main limitation affecting the use of this soil as a site for dwellings with basements. Grading the soil so that surface water moves away from the dwelling and installing interceptor drains to divert water from the higher adjacent areas will reduce the wetness. Installing drains around footings and foundations and sealing the foundations also will reduce the wetness.

Local roads and streets.—Wetness and the potential for frost action are the main limitations. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action. Constructing on raised fill material and installing a drainage system will reduce the wetness.

Septic tank absorption fields.—Wetness and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept runoff from the higher adjacent areas. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which the effluent is absorbed.

Capability classification.—IIIw

BuC—Burdett channery silt loam, 8 to 15 percent slopes. This soil is very deep, strongly sloping, and somewhat poorly drained. It is on ridges and side slopes on glacial till plains. It formed in acid glacial till derived mainly from shale. Areas are long and narrow and range from 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 9 inches, dark brown channery silt loam that has 25 percent rock fragments
Subsurface layer:
9 to 15 inches, brown channery silt loam that has dark yellowish brown mottles and 25 percent rock fragments
15 to 20 inches, grayish brown and dark brown channery silt loam that has strong brown and light gray mottles and 20 percent rock fragments
Subsoil:
20 to 36 inches, brown channery clay loam that has yellowish brown and light gray mottles and 20 percent rock fragments
Substratum:
36 to 60 inches, brown channery loam that has yellowish brown and light gray mottles and 20 percent rock fragments

Inclusions.—Included with this soil in mapping are small areas of the poorly drained and very poorly drained Canandaigua and Lyons soils in depressions and drainageways; areas of the moderately well drained Nunda soils on side slopes; and areas of soils that are similar to the Burdett soil but are more acid throughout

or contain less clay in the subsoil. Also included are areas of Volusia soils. Included areas are as much as 3 acres each in size and make up 15 to 25 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and subsurface layer and slow in the subsoil and substratum
Available water capacity: Moderate
Soil reaction: Strongly acid to neutral in the surface layer, subsurface layer, and subsoil and slightly acid to moderately alkaline in the substratum
Depth to the seasonal high water table: 6 inches to 1.5 feet (December through May)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Rapid
Erosion hazard: Moderate

Use.—Most areas of this soil are used as pasture. A few areas are used for cultivated crops.

Crops and pasture.—This soil is moderately suited to cultivated crops. Wetness and erosion are the main management concerns. A combination of random subsurface drains and shallow surface ditches will reduce the wetness. Contour farming or stripcropping and a conservation tillage system that leaves crop residue on the surface will help to control erosion. Properly managing crop residue and regularly adding other organic material will help to maintain tilth.

This soil is well suited to pasture, although wetness is a limitation. Deferment of grazing during wet periods will help to keep the pasture in good condition. Rotation grazing, proper stocking rates, applications of fertilizer, and weed control will increase forage yields.

Woodland.—The potential productivity of this soil for sugar maple is moderate. Seasonal wetness limits the use of equipment and causes seedling mortality and windthrow.

Dwellings.—Wetness is the main limitation affecting the use of this soil as a site for dwellings with basements. Grading the soil so that surface water moves away from the dwelling and installing interceptor drains to divert water from the higher adjacent areas will reduce the wetness. Installing drains around footings and foundations and sealing the foundations also will reduce the wetness. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—Wetness and the potential for frost action are the main imitations. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action. Constructing on raised fill material and installing a drainage system will reduce the wetness.

Septic tank absorption fields.—Wetness and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept runoff from the higher adjacent areas. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which the effluent is absorbed.

Capability classification.—IIIe

BvC—Burdett channery silt loam, 3 to 15 percent slopes, very stony. This soil is very deep, gently sloping to strongly sloping, and somewhat poorly drained. It is on ridges and side slopes on glacial till plains. It formed in acid glacial till derived mainly from shale. Stones that are 10 to 24 inches in diameter cover as much as 3 percent of the surface. Areas are long and narrow or irregular in shape and range from 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 9 inches, dark brown channery silt loam that has 25 percent rock fragments
Subsurface layer:
9 to 15 inches, brown channery silt loam that has dark yellowish brown mottles and 25 percent rock fragments
15 to 20 inches, grayish brown and dark brown channery silt loam that has strong brown and light gray mottles and 20 percent rock fragments
Subsoil:
20 to 36 inches, brown channery clay loam that has yellowish brown and light gray mottles and 20 percent rock fragments
Substratum:
36 to 60 inches, brown channery loam that has yellowish brown and light gray mottles and 20 percent rock fragments

Inclusions.—Included with this soil in mapping are small areas of the poorly drained and very poorly drained, very stony Lyons soils in depressions and drainageways; areas of the moderately well drained Nunda soils on side slopes; and areas of soils that are similar to the Burdett soil but are more acid throughout or contain less clay in the subsoil. Also included are areas of the very stony Volusia soils. Included areas are as much as 3 acres each in size and make up 15 to 25 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and subsurface layer and slow in the subsoil and substratum
Available water capacity: Moderate
Soil reaction: Strongly acid to neutral in the surface layer, subsurface layer, and subsoil and slightly acid to moderately alkaline in the substratum
Depth to the seasonal high water table: 6 inches to 1.5 feet (December through May)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Medium
Erosion hazard: Moderate

Use.—Most areas of this soil are used as pasture. A few areas are used for cultivated crops.

Crops and pasture.—This soil is generally unsuited to cultivated crops and is poorly suited to pasture because of the stones on the surface, wetness, and the erosion hazard. Deferment of grazing during wet periods will help to keep the pasture in good condition. Rotation grazing, proper stocking rates, applications of fertilizer, and weed control will increase forage yields.

Woodland.—The potential productivity of this soil for sugar maple is moderate. Seasonal wetness limits the use of equipment and causes seedling mortality and windthrow.

Dwellings.—Wetness is the main limitation affecting the use of this soil as a site for dwellings with basements. Grading the soil so that surface water moves away from the dwelling and installing interceptor drains to divert water from the higher adjacent areas will reduce the wetness. Installing drains around footings and foundations and sealing the foundations also will reduce the wetness. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—Wetness and the potential for frost action are the main limitations. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action. Constructing on raised fill material and installing a drainage system will reduce the wetness.

Septic tank absorption fields.—Wetness and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept runoff from the higher adjacent areas. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which the effluent is absorbed.

Capability classification.—VIs

BwB—Busti silt loam, 3 to 8 percent slopes. This soil is very deep, gently sloping, and moderately well drained. It is on the smooth parts of ridges on glacial till plains. It formed in glacial till derived from shale and thinly bedded sandstone. Areas are irregular in shape and range from 5 to 90 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, dark grayish brown silt loam
Subsoil:
8 to 14 inches, dark brown channery silt loam that has light olive brown mottles
14 to 26 inches, dark brown channery silt loam that has grayish brown mottles
Substratum:
26 to 60 inches, dark brown channery silt loam that has dark grayish brown mottles

Inclusions.—Included with this soil in mapping are small areas of the well drained Valois and moderately well drained Chautauqua soils on the slightly higher parts of the till plains. Also included are areas of the shallow Arnot and Tuller soils and the moderately deep Lordstown soils. Included areas are as much as 3 acres each in size and make up 15 to 20 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and subsoil and moderately slow in the substratum
Available water capacity: Moderate
Soil reaction: Moderately acid or slightly acid throughout the profile
Depth to the seasonal high water table: 1.5 to 2.0 feet (November through April)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Medium
Erosion hazard: Slight

Use.—Most areas are used for cultivated crops. A few areas are used as pasture. This soil is classified as prime farmland.

Crops and pasture.—This soil is well suited to cultivated crops. A conservation tillage system that leaves crop residue on the surface after planting will help to control erosion. Properly managing crop residue and regularly adding other organic material will help to maintain tilth.

This soil is well suited to pasture. Rotation grazing, proper stocking rates, applications of fertilizer, and weed control will increase forage yields.

Woodland.—The potential productivity of this soil for

red maple is moderate. Few or no limitations affect woodland management.

Dwellings.—Wetness is the main limitation affecting the use of this soil as a site for dwellings with basements. Grading the soil so that surface water moves away from the dwelling and installing interceptor drains to divert water from the higher adjacent areas will reduce the wetness. Installing drains around footings and foundations and sealing the foundations also will reduce the wetness.

Local roads and streets.—Wetness and the potential for frost action are the main limitations. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action. Raised fill material and a drainage system will reduce the wetness.

Septic tank absorption fields.—Wetness and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept runoff from the higher adjacent areas. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which the effluent is absorbed.

Capability classification.—IIw

Ca—Canandaigua silt loam. This soil is very deep, nearly level, and poorly drained and very poorly drained. It is in depressional areas on lake plains and till plains. It formed in lacustrine sediments. Slopes range from 0 to 3 percent. Areas are long and narrow and range from 5 to 40 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 7 inches, very dark gray silt loam

Subsoil:
- 7 to 10 inches, gray silt loam that has strong brown and grayish brown mottles
- 10 to 33 inches, gray silt loam that has gray and strong brown mottles
- 33 to 40 inches, grayish brown silt loam that has gray and strong brown mottles

Substratum:
- 40 to 60 inches, light gray silt loam that has strong brown mottles

Inclusions.—Included with this soil in mapping are small areas of the poorly drained and very poorly drained Lyons soils in depressions, small areas of the organic Carlisle soils near the center of the depressions, and small areas of the somewhat poorly drained and poorly drained Tuller soils, which have bedrock within a depth of 60 inches. Included areas are as much as 3 acres each in size and make up about 20 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and moderately slow in the subsoil and substratum
Available water capacity: High
Soil reaction: Moderately acid to mildly alkaline in the surface layer, slightly acid to mildly alkaline in the subsoil, and neutral to moderately alkaline in the substratum
Depth to the seasonal high water table: 0 to 1 foot (November through May)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Ponded
Erosion hazard: None

Use.—Most areas of this soil are used for pasture or cultivated crops. A few areas are used as woodland.

Crops and pasture.—This soil is poorly suited to cultivated crops because of wetness. A combination of surface ditches and subsurface drains will reduce the wetness where suitable outlets are available. Even if those practices are used, however, the wetness can damage crops and in some years will interfere with planting and harvesting.

This soil is moderately suited to pasture. A drainage system is needed. Deferred grazing during wet periods, rotation grazing, proper stocking rates, and weed control are the main management needs.

Woodland.—The potential productivity of this soil for red maple is moderate. Wetness causes seedling mortality and windthrow and limits the use of heavy equipment.

Dwellings.—Wetness is the major limitation affecting the use of this soil as a site for dwellings.

Local roads and streets.—Wetness and the potential for frost action are the main limitations. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action. Raised fill material and a drainage system will reduce the wetness.

Septic tank absorption fields.—Wetness and the restricted permeability are the major limitations.

Capability classification.—IIIw

Cc—Carlisle muck. This soil is very deep, nearly level, and very poorly drained. It is in bogs and depressions on lake, till, and outwash plains. It formed in organic deposits. Slopes are 0 to 1 percent. Areas are oval or irregular in shape and range from 5 to 200 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 12 inches, black muck
Subsurface layer:
12 to 35 inches, very dark brown muck
35 to 48 inches, dark reddish brown muck
48 to 62 inches, dark yellowish brown muck
62 to 75 inches, very dark grayish brown muck

Inclusions.—Included with this soil in mapping are small areas of the poorly drained and very poorly drained Alden, Suny, and Lyons soils. These soils are in landscape positions similar to those of the Carlisle soil. Also included are areas of soils that are similar to the Carlisle soil but have organic deposits less than 51 inches thick and areas of the ponded Hydraquents. Included areas are as much as 3 acres each in size and make up about 15 to 25 percent of the unit.

Major soil properties—

Permeability: Moderately slow to moderately rapid throughout the profile
Available water capacity: High
Soil reaction: Very strongly acid to neutral throughout the profile
Seasonal high water table: 6 inches above to 1 foot below the surface (September through June)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Ponded
Erosion hazard: None

Use.—Most areas of this soil are used as woodland.

Crops and pasture.—This soil is not suited to cultivated crops and pasture because of wetness. Wind erosion and subsidence are hazards. Draining most areas is difficult because they are on the lowest parts of the landscape, where suitable outlets are not available. Installing a drainage system increases the rate of subsidence and decomposition. Most of the time the surface layer is too soft for grazing.

Woodland.—The potential productivity of this soil for red maple is moderate. Wetness causes seedling mortality and windthrow and limits the use of equipment.

Dwellings.—Subsidence, ponding, and low strength are the main limitations.

Local roads and streets.—Subsidence, ponding, and the potential for frost action are the main limitations.

Septic tank absorption fields.—Prolonged periods when water is on the surface, subsidence, and the restricted permeability are the main limitations. A poor filtering capacity and contamination of the ground water are management concerns.

Capability classification.—Vw

ChB—Chautauqua loam, 3 to 8 percent slopes. This soil is very deep, gently sloping, and moderately well drained. It is on drumlins, valley walls, and foothills on glacial till plains. It formed in glacial till derived from shale and thinly bedded sandstone. Areas are oval or long and narrow and range from 5 to 60 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, dark brown loam that has 10 percent rock fragments
Subsoil:
8 to 20 inches, dark yellowish brown gravelly loam that has 20 percent rock fragments
20 to 35 inches, brown gravelly loam that has grayish brown and strong brown mottles and 25 percent rock fragments
Substratum:
35 to 60 inches, dark grayish brown gravelly loam that has 30 percent rock fragments

Inclusions.—Included with this soil in mapping are small areas of the well drained Valois and Lackawanna soils on the slightly higher parts of the till plains. Also included are areas of the somewhat poorly drained Busti soils in depressions. Included areas are as much as 3 acres each in size and make up 15 to 20 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and subsoil and moderately slow in the substratum
Available water capacity: Moderate
Soil reaction: Moderately acid or slightly acid throughout the profile
Depth to the seasonal high water table: 1.5 to 2.0 feet (November through April)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Medium
Erosion hazard: Slight

Use.—Most areas are used for cultivated crops. A few areas are used as pasture. This soil is classified as prime farmland.

Crops and pasture.—This soil is well suited to cultivated crops. A conservation tillage system that leaves crop residue on the surface after planting will help to control erosion. Properly managing crop residue and regularly adding other organic material will help to maintain tilth.

This soil is well suited to pasture. Rotation grazing, proper stocking rates, applications of fertilizer, and weed control will increase forage yields.

Woodland.—The potential productivity of this soil for red maple is moderate. Few or no limitations affect woodland management.

Dwellings.—Wetness is the main limitation affecting the use of this soil as a site for dwellings with basements. Grading the soil so that surface water moves away from the dwelling and installing interceptor drains to divert water from the higher adjacent areas will reduce the wetness. Installing drains around footings and foundations and sealing the foundations also will reduce the wetness.

Local roads and streets.—Wetness and the potential for frost action are the main limitations. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action. Raised fill material and a drainage system will reduce the wetness.

Septic tank absorption fields.—Wetness and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept runoff from the higher adjacent areas. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which the effluent is absorbed.

Capability classification.—IIw

ChC—Chautauqua loam, 8 to 15 percent slopes. This soil is very deep, strongly sloping, and moderately well drained. It is on drumlins, valley walls, and foothills on glacial till plains. It formed in glacial till derived from shale and thinly bedded sandstone. Areas are oval or long and narrow and range from 5 to 60 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 8 inches, dark brown loam that has 10 percent rock fragments

Subsoil:
- 8 to 20 inches, dark yellowish brown gravelly loam that has 20 percent rock fragments
- 20 to 35 inches, brown gravelly loam that has grayish brown and strong brown mottles and 25 percent rock fragments

Substratum:
- 35 to 60 inches, dark grayish brown gravelly loam that has 30 percent rock fragments

Inclusions.—Included with this soil in mapping are small areas of the well drained Valois and Lackawanna soils on the slightly higher parts of the till plains. Also included are areas of the somewhat poorly drained Busti and Volusia soils in depressions and the poorly drained and very poorly drained Alden soils on the lowest parts of the landscape. Included areas are as much as 3 acres each in size and make up 15 to 25 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and subsoil and moderately slow in the substratum
Available water capacity: Moderate
Soil reaction: Moderately acid or slightly acid throughout the profile
Depth to the seasonal high water table: 1.5 to 2.0 feet (November through April)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Medium
Erosion hazard: Moderate

Use.—Most areas of this soil are used for cultivated crops. A few areas are used as pasture.

Crops and pasture.—This soil is moderately suited to cultivated crops. Erosion is the main hazard. Contour farming or stripcropping and a conservation tillage system that leaves crop residue on the surface after planting will help to control erosion. Properly managing crop residue and regularly adding other organic material will help to maintain tilth.

This soil is well suited to pasture. Erosion is a hazard if the pasture is overgrazed. Rotation grazing, proper stocking rates, applications of fertilizer, and weed control will increase forage yields.

Woodland.—The potential productivity of this soil for red maple is moderate. Few or no limitations affect woodland management.

Dwellings.—Wetness is the main limitation affecting the use of this soil as a site for dwellings with basements. Grading the soil so that surface water moves away from the dwelling and installing interceptor drains to divert water from the higher adjacent areas will reduce the wetness. Installing drains around footings and foundations and sealing the foundations also will reduce the wetness. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—Wetness and the potential for frost action are the main limitations. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action. Raised fill material and a drainage system will reduce the wetness.

Septic tank absorption fields.—Wetness and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept runoff from the higher adjacent areas. Enlarging the absorption fields or the trenches below

the distribution lines will increase the rate at which the effluent is absorbed.

Capability classification.—IIe

CnA—Chenango gravelly loam, 0 to 3 percent slopes. This soil is very deep, nearly level, and well drained and somewhat excessively drained. It is on outwash plains and terraces. It formed in sandy outwash that contains gravel. Areas are broad and irregular in shape and range from 5 to 40 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 4 inches, dark brown gravelly loam that has 25 percent rock fragments

Subsoil:
- 4 to 11 inches, brown gravelly loam that has 30 percent rock fragments
- 11 to 26 inches, dark brown very gravelly loam that has 45 percent rock fragments

Substratum:
- 26 to 34 inches, dark brown very gravelly loamy sand that has 60 percent rock fragments
- 34 to 60 inches, stratified sand and gravel having 65 percent rock fragments

Inclusions.—Included with this soil in mapping are small areas of soils that are underlain by clay within a depth of 40 inches. Also included are areas of soils that are shallow to bedrock, Riverhead soils, and Valois soils on the surrounding valley slopes and walls. Included areas are as much as 3 acres each in size and make up 15 to 25 percent of the unit.

Major soil properties—

Permeability: Moderate or moderately rapid in the surface layer and subsoil and rapid in the substratum
Available water capacity: Low
Soil reaction: Very strongly acid or strongly acid in the surface layer, very strongly acid to moderately acid in the subsoil, and strongly acid to moderately alkaline in the substratum
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Slow
Erosion hazard: Slight

Use.—Most areas are used for cultivated crops. A few areas are used as pasture. This soil is classified as prime farmland.

Crops and pasture.—This soil is well suited to cultivated crops. The low available water capacity is the main limitation. Erosion is a hazard. A conservation tillage system that leaves crop residue on the surface after planting will help to control erosion. Properly managing crop residue and regularly adding other organic material will conserve soil moisture. Irrigation systems function well on this soil and are often used in areas where vegetable crops are grown.

This soil is very well suited to pasture. Deferment of grazing during droughty periods will help to keep the pasture in good condition. Rotation grazing, proper stocking rates, applications of fertilizer, and weed control will increase forage yields.

Woodland.—The potential productivity of this soil for red maple is moderately high. Few or no limitations affect woodland management.

Dwellings.—This soil is generally suitable as a site for dwellings.

Local roads and streets.—The potential for frost action is the main limitation. It can be reduced by a coarse grained subgrade to frost depth.

Septic tank absorption fields.—A poor filtering capacity is the main limitation. Contamination of the ground water is a hazard.

Capability classification.—IIs

CnB—Chenango gravelly loam, 3 to 8 percent slopes. This soil is very deep, gently sloping, and well drained and somewhat excessively drained. It is on outwash plains and terraces. It formed in sandy outwash that contains gravel. Areas are irregular in shape and range from 5 to 75 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 4 inches, dark brown gravelly loam that has 25 percent rock fragments

Subsoil:
- 4 to 11 inches, brown gravelly loam that has 30 percent rock fragments
- 11 to 26 inches, dark brown very gravelly loam that has 45 percent rock fragments

Substratum:
- 26 to 34 inches, dark brown very gravelly loamy sand that has 60 percent rock fragments
- 34 to 60 inches, stratified sand and gravel having 65 percent rock fragments

Inclusions.—Included with this soil in mapping are small areas of soils that are underlain by clay within a depth of 40 inches. Also included are areas of soils that are shallow to bedrock, Riverhead soils, the moderately deep Lordstown soils, Tioga soils on flood plains, and Valois soils on the surrounding valley slopes and walls. Included areas are as much as 3 acres each in size

and make up 15 to 20 percent of the unit.

Major soil properties—

Permeability: Moderate or moderately rapid in the surface layer and subsoil and rapid in the substratum
Available water capacity: Low
Soil reaction: Very strongly acid or strongly acid in the surface layer, very strongly acid to moderately acid in the subsoil, and strongly acid to moderately alkaline in the substratum
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Medium
Erosion hazard: Slight

Use.—Most areas are used for cultivated crops. A few areas are used as pasture. This soil is classified as prime farmland.

Crops and pasture.—This soil is well suited to cultivated crops. The low available water capacity is the main limitation. Erosion is a hazard. A conservation tillage system that leaves crop residue on the surface after planting will help to control erosion. Properly managing crop residue and regularly adding other organic material will conserve soil moisture. Irrigation systems function well on this soil and are often used in areas where vegetable crops are grown.

This soil is very well suited to pasture. Erosion is a hazard if the pasture is overgrazed. Deferment of grazing during droughty periods will help to keep the pasture in good condition. Rotation grazing, proper stocking rates, applications of fertilizer, and weed control will increase forage yields.

Woodland.—The potential productivity of this soil for red maple is moderately high. Few or no limitations affect woodland management.

Dwellings.—This soil is generally suitable as a site for dwellings.

Local roads and streets.—The potential for frost action is the main limitation. It can be reduced by a coarse grained subgrade to frost depth.

Septic tank absorption fields.—A poor filtering capacity is the main limitation. Contamination of the ground water is a hazard.

Capability classification.—IIs

CnC—Chenango gravelly loam, rolling. This soil is very deep, gently sloping, and well drained and somewhat excessively drained. It is on outwash plains and terraces. It formed in sandy outwash that contains gravel. Slopes range from 5 to 16 percent. Areas are irregular in shape and range from 5 to 125 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 4 inches, dark brown gravelly loam that has 25 percent rock fragments
Subsoil:
4 to 11 inches, brown gravelly loam that has 30 percent rock fragments
11 to 26 inches, dark brown very gravelly loam that has 45 percent rock fragments
Substratum:
26 to 34 inches, dark brown very gravelly loamy sand that has 60 percent rock fragments
34 to 60 inches, stratified sand and gravel having 65 percent rock fragments

Inclusions.—Included with this soil in mapping are small areas of the moderately deep Lordstown soils, Tioga soils on flood plains, Riverhead soils, and Valois soils on the surrounding valley slopes and walls. Included areas are as much as 3 acres each in size and make up about 15 percent of the unit.

Major soil properties—

Permeability: Moderate or moderately rapid in the surface layer and subsoil and rapid in the substratum
Available water capacity: Low
Soil reaction: Very strongly acid or strongly acid in the surface layer, very strongly acid to moderately acid in the subsoil, and strongly acid to moderately alkaline in the substratum
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Medium or rapid
Erosion hazard: Moderate

Use.—Most areas of this soil are used for cultivated crops. A few areas are used as pasture.

Crops and pasture.—This soil is moderately suited to cultivated crops. The low available water capacity and the erosion hazard are the main management concerns. Contour farming, stripcropping, terraces, and a conservation tillage system that leaves crop residue on the surface after planting will help to control erosion. Properly managing crop residue and regularly adding other organic material will conserve soil moisture.

This soil is well suited to pasture. Erosion is a hazard if the pasture is overgrazed. Deferment of grazing during droughty periods will help to keep the pasture in

good condition. Rotation grazing, proper stocking rates, applications of fertilizer, and weed control will increase forage yields.

Woodland.—The potential productivity of this soil for red maple is moderately high. Few or no limitations affect woodland management.

Dwellings.—The slope is the main limitation. Special design helps to overcome this limitation. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—The slope and the potential for frost action are the main limitations. A coarse grained subgrade to frost depth will reduce the potential for frost action. Building roads on the contour helps to overcome the slope.

Septic tank absorption fields.—A poor filtering capacity is the main limitation. Contamination of the ground water is a hazard.

Capability classification.—IIe

Co—Covington and Madalin soils. This unit consists of very deep soils on the lower parts of lake and marine plains in the eastern part of the county. These soils formed in lacustrine or marine sediments. Slopes range from 0 to 3 percent. Areas are broad and irregular in shape and range to 150 acres in size. The total acreage of the unit is about 40 percent poorly drained Covington soil, 35 percent poorly drained and very poorly drained Madalin soil, and 25 percent other soils. Some areas consist mainly of Covington soil, some mainly of Madalin soil, and some of both soils. These soils were mapped together because they are used and managed in similar ways.

The typical sequence, depth, and composition of the layers of the Covington soil are as follows—

Surface layer:
- 0 to 7 inches, very dark grayish brown, firm silty clay

Subsoil:
- 7 to 13 inches, gray, firm clay that has strong brown and light brownish gray mottles
- 13 to 28 inches, gray, firm clay that has yellowish brown and olive brown mottles

Substratum:
- 28 to 60 inches, gray silty clay that has yellowish brown mottles

The typical sequence, depth, and composition of the layers of the Madalin soil are as follows—

Surface layer:
- 0 to 9 inches, very dark gray silt loam

Subsoil:
- 9 to 15 inches, dark grayish brown silty clay that has yellowish brown mottles
- 15 to 30 inches, gray, firm silty clay that has yellowish brown mottles

Substratum:
- 30 to 60 inches, dark grayish brown silty clay that has gray, dark yellowish brown, and yellowish brown mottles

Inclusions.—Included in this unit in mapping are small areas of the moderately well drained Hudson and Vergennes soils on the higher parts of the plains. Also included are the shallow Nassau soils and the somewhat poorly drained Kingsbury and Rhinebeck soils. Included areas are as much as 5 acres each in size.

Major properties of the Covington soil—

Permeability: Slow or very slow in the surface layer and very slow in the subsoil and substratum
Available water capacity: Moderate
Soil reaction: Moderately acid to neutral in the surface layer, moderately acid to mildly alkaline in the subsoil, and neutral to moderately alkaline in the substratum
Depth to the seasonal high water table: 6 inches to 1 foot (October through May)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Slow
Erosion hazard: Slight

Major properties of the Madalin soil—

Permeability: Moderately slow in the surface layer, slow in the subsoil, and slow or very slow in the substratum
Available water capacity: Moderate
Soil reaction: Moderately acid to mildly alkaline in the surface layer and subsoil and mildly alkaline or moderately alkaline in the substratum
Depth to the seasonal high water table: 0 to 6 inches (November through June)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Slow
Erosion hazard: Slight

Use.—Most areas of this unit are used for cultivated crops or pasture. A few areas are used as woodland.

Crops and pasture.—This unit is poorly suited to cultivated crops because of wetness. The clayey texture also is a limitation. A combination of closely spaced

subsurface drains and surface ditches will reduce the wetness where suitable outlets are available. A conservation tillage system that leaves crop residue on the surface after planting will help to control erosion. Properly managing crop residue and regularly adding other organic material will improve tilth.

This unit is moderately suited to pasture. Wetness is the main limitation. The clayey texture limits grazing. A drainage system of closely spaced drains and surface ditches will reduce the wetness. Deferment of grazing during wet periods will help to keep the pasture in good condition. Rotation grazing, proper stocking rates, applications of fertilizer, and weed control will increase forage yields.

Woodland.—The potential productivity for eastern white pine is high on the Covington soil, and the potential productivity for red maple is moderate on the Madalin soil. Wetness and the clayey texture cause seedling mortality and windthrow and restrict the use of equipment.

Dwellings.—Prolonged periods of wetness and the shrink-swell potential are the major limitations.

Local roads and streets.—Low strength, the potential for frost action, and wetness are the main limitations. Raised fill of coarse grained material to frost depth will reduce the potential for frost action and wetness and improve soil strength.

Septic tank absorption fields.—Wetness and the restricted permeability are the main limitations.

Capability classification.—IVw

Du—Dumps, landfill. This unit consists of sanitary landfills, industrial dumps, and other sites that have been used for the disposal of trash and rubble. It is mainly near urban areas. Slopes generally are less than 5 percent at the top of the landfill and are as much as 25 percent on side slopes. Areas range from 3 to 100 acres in size.

The material deposited in these areas is generally paper, building material, tree stumps, rock and concrete fragments, tires, junk cars, and commercial and industrial refuse.

Permeability, available water capacity, and other properties depend on the material in specific areas of the unit. Onsite investigation is needed to determine the suitability of the unit for any use. Cave-ins are a hazard because the underlying material is unstable.

No capability classification is assigned.

ElB—Elka channery loam, 3 to 8 percent slopes. This soil is very deep, gently sloping, and well drained. It is on knolls and the smoother valley sides at high elevations in the Catskill Mountains. It formed in glacial till derived from reddish sandstone and siltstone. Areas are irregular in shape and range from 5 to 50 acres in size.

Typically, the surface is covered by a layer of partly decomposed leaf litter about 3 inches thick. The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, dark reddish brown channery loam that has 15 percent rock fragments

Subsoil:
8 to 14 inches, reddish brown channery loam that has 20 percent rock fragments
14 to 32 inches, reddish brown channery loam that has 25 percent rock fragments

Substratum:
32 to 60 inches, reddish brown channery very fine sandy loam that has 30 percent rock fragments

Inclusions.—Included with this soil in mapping are small areas of Lewbeach, Willowemoc, and Onteora soils on the top of knolls and in valleys. Also included are a few areas of the moderately deep Vly soils and the shallow Halcott soils, areas of soils that are similar to the Elka soil but have bedrock at a depth of 40 to 60 inches, and areas of very stony and bouldery soils. Included areas are as much as 5 acres each in size and make up 15 to 25 percent of the unit.

Major soil properties—

Permeability: Moderate throughout the profile
Available water capacity: High
Soil reaction: Very strongly acid to moderately acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Medium
Erosion hazard: Slight

Use.—Most areas are used for cultivated crops or pasture. This soil is classified as prime farmland.

Crops and pasture.—This soil is well suited to cultivated crops. The growing season is short, but this limitation can be overcome by selecting suitable crop varieties. A conservation tillage system that leaves crop residue on the surface after planting will control erosion. Properly managing crop residue and regularly adding other organic material will help to maintain tilth and the content of organic matter.

This soil is well suited to pasture. Rotation grazing, proper stocking rates, applications of fertilizer, and weed control will increase forage yields.

Woodland.—The potential productivity of this soil for sugar maple is moderate. Few or no limitations affect woodland management.

Dwellings.—This soil is generally suitable as a site for dwellings.

Local roads and streets.—The potential for frost action is the main limitation. It can be reduced by a coarse grained subgrade to frost depth.

Septic tank absorption fields.—The restricted permeability is the main limitation. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which the effluent is absorbed.

Capability classification.—IIe

ElC—Elka channery loam, 8 to 15 percent slopes. This soil is very deep, strongly sloping, and well drained. It is on knolls and the smoother valley sides at high elevations in the Catskill Mountains. It formed in glacial till derived from reddish sandstone and siltstone. Areas are irregular in shape and range from 5 to 75 acres in size.

Typically, the surface is covered by a layer of partly decomposed leaf litter about 3 inches thick. The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, dark reddish brown channery loam that has 15 percent rock fragments

Subsoil:
8 to 14 inches, reddish brown channery loam that has 20 percent rock fragments
14 to 32 inches, reddish brown channery loam that has 25 percent rock fragments

Substratum:
32 to 60 inches, reddish brown channery very fine sandy loam that has 30 percent rock fragments

Inclusions.—Included with this soil in mapping are small areas of Lewbeach, Willowemoc, and Onteora soils on the top of knolls and in valleys. Also included are a few areas of the moderately deep Vly soils and the shallow Halcott soils, areas of soils that are similar to the Elka soil but have bedrock at a depth of 40 to 60 inches, and areas of very stony and bouldery soils. Included areas are as much as 5 acres each in size and make up 15 to 25 percent of the unit.

Major soil properties—

Permeability: Moderate throughout the profile
Available water capacity: High
Soil reaction: Very strongly acid to moderately acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Medium or rapid
Erosion hazard: Moderate

Use.—Most areas of this soil are used for cultivated crops or pasture. A few areas are used as woodland.

Crops and pasture.—This soil is moderately suited to cultivated crops. Erosion is the main hazard. The growing season is short, but this limitation can be overcome by selecting suitable crop varieties. Contour farming, stripcropping, terraces, and a conservation tillage system that leaves crop residue on the surface after planting will help to control erosion. Properly managing crop residue and regularly adding other organic material will help to maintain tilth and the content of organic matter.

This soil is well suited to pasture. Overgrazing increases the hazard of erosion. Rotation grazing, proper stocking rates, applications of fertilizer, and weed control will increase forage yields.

Woodland.—The potential productivity of this soil for sugar maple is moderate. Few or no limitations affect woodland management.

Dwellings.—The slope is the main limitation. Special design will help to overcome this limitation. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—The potential for frost action and the slope are the main limitations. Special design will help to overcome the slope. A coarse grained subgrade to frost depth will reduce the potential for frost action.

Septic tank absorption fields.—The restricted permeability and the slope are the main limitations. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which the effluent is absorbed. Installing the distribution lines on the contour and providing distribution boxes or other structures that promote the even distribution of effluent will help to overcome the slope.

Capability classification.—IIIe

ElD—Elka channery loam, 15 to 25 percent slopes. This soil is very deep, moderately steep, and well drained. It is on the top and sides of valleys at high elevations in the Catskill Mountains. It formed in glacial till derived from reddish sandstone and siltstone. Areas are irregular in shape and range from 5 to 75 acres in size.

Typically, the surface is covered by a layer of partly decomposed leaf litter about 3 inches thick. The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, dark reddish brown channery loam that has 15 percent rock fragments

Subsoil:
8 to 14 inches, reddish brown channery loam that has 20 percent rock fragments
14 to 32 inches, reddish brown channery loam that has 25 percent rock fragments

Substratum:
32 to 60 inches, reddish brown channery very fine sandy loam that has 30 percent rock fragments

Inclusions.—Included with this soil in mapping are small areas of Lewbeach, Willowemoc, and Onteora soils on the top of knolls and in valleys. Also included are a few areas of the moderately deep Vly soils and the shallow Halcott soils, areas of soils that are similar to the Elka soil but have bedrock at a depth of 40 to 60 inches, and areas of very stony and bouldery soils. Included areas are as much as 5 acres each in size and make up 15 to 25 percent of the unit.

Major soil properties—

Permeability: Moderate throughout the profile
Available water capacity: High
Soil reaction: Very strongly acid to moderately acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Rapid
Erosion hazard: Severe

Use.—Most areas of this soil are used for cultivated crops or pasture. A few areas are used as woodland.

Crops and pasture.—This soil is poorly suited to cultivated crops. Erosion is the main hazard, and the slope limits the use of equipment. The growing season is short, but this limitation can be overcome by selecting suitable crop varieties. Contour farming, stripcropping, terraces, a conservation tillage system that leaves crop residue on the surface after planting, and a crop rotation that includes several years of close-growing crops will help to control erosion. Properly managing crop residue and regularly adding other organic material will help to maintain tilth and the content of organic matter.

This soil is moderately suited to pasture. The slope and the hazard of erosion are management concerns. Rotation grazing, proper stocking rates, applications of fertilizer, and weed control will increase forage yields.

Woodland.—The potential productivity of this soil for sugar maple is moderate. The slope limits the use of equipment.

Dwellings.—The slope is the main limitation. Special design and grading will help to overcome this limitation. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites. Quickly establishing a plant cover after construction also helps to control erosion.

Local roads and streets.—The slope is the main limitation. Special design and grading will help to overcome this limitation.

Septic tank absorption fields.—The restricted permeability and the slope are the main limitations. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which the effluent is absorbed. Installing the distribution lines on the contour and providing distribution boxes or other structures that promote the even distribution of effluent will help to overcome the slope.

Capability classification.—IVe

EmC—Elka channery loam, rolling, very stony. This soil is very deep and well drained. It is on irregularly sloping sides of valleys at high elevations in the Catskill Mountains. It formed in glacial till derived from reddish sandstone and siltstone. Stones as much as 10 inches in diameter cover about 3 percent of the surface. Slopes range from 5 to 15 percent. Areas are irregular in shape and range from 5 to 50 acres in size.

Typically, the surface is covered by a layer of partly decomposed leaf litter about 3 inches thick. The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, dark reddish brown channery loam that has 15 percent rock fragments

Subsoil:
8 to 14 inches, reddish brown channery loam that has 20 percent rock fragments
14 to 32 inches, reddish brown channery loam that has 25 percent rock fragments

Substratum:
32 to 60 inches, reddish brown channery very fine sandy loam that has 30 percent rock fragments

Inclusions.—Included with this soil in mapping are small areas of Lewbeach, Willowemoc, and Onteora soils on the top of knolls and in valleys. Also included are a few areas of the moderately deep Vly soils and the shallow Halcott soils and areas of soils that are similar to the Elka soil but have bedrock at a depth of 40 to 60 inches. Included areas are as much as 5 acres each in size and make up 15 to 25 percent of the unit.

Major soil properties—

Permeability: Moderate throughout the profile

Available water capacity: High
Soil reaction: Very strongly acid to moderately acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Medium
Erosion hazard: Moderate

Use.—Most areas of this soil are used as woodland. A few areas are used for cultivated crops or pasture.

Crops and pasture.—This soil is generally unsuited to cultivated crops and is poorly suited to pasture. The stones on the surface, erosion, and a short growing season are the main limitations. Rotation grazing, proper stocking rates, applications of fertilizer, and weed control will increase forage yields.

Woodland.—The potential productivity of this soil for sugar maple is moderate. Few or no limitations affect woodland management.

Dwellings.—The slope is the main limitation. Special design will help to overcome this limitation. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—The potential for frost action and the slope are the main limitations. Special design will help to overcome the slope. A coarse grained subgrade to frost depth will reduce the potential for frost action.

Septic tank absorption fields.—The restricted permeability and the slope are the main limitations. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which the effluent is absorbed. Installing the distribution lines on the contour and providing distribution boxes or other structures that promote the even distribution of effluent will help to overcome the slope.

Capability classification.—VIs

EmD—Elka channery loam, hilly, very stony. This soil is very deep and well drained. It is on the irregularly sloping sides of valleys at high elevations in the Catskill Mountains. It formed in glacial till derived from reddish sandstone and siltstone. Stones as much as 10 inches in diameter cover about 3 percent of the surface. Slopes range from 15 to 35 percent. Areas are irregular in shape and range from 5 to 75 acres in size.

Typically, the surface is covered by a layer of partly decomposed leaf litter about 3 inches thick. The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, dark reddish brown channery loam that has 15 percent rock fragments
Subsoil:
8 to 14 inches, reddish brown channery loam that has 20 percent rock fragments
14 to 32 inches, reddish brown channery loam that has 25 percent rock fragments
Substratum:
32 to 60 inches, reddish brown channery very fine sandy loam that has 30 percent rock fragments

Inclusions.—Included with this soil in mapping are small areas of Lewbeach, Willowemoc, and Onteora soils on the top of knolls and in valleys. Also included are a few areas of the moderately deep Vly soils and the shallow Halcott soils and areas of soils that are similar to the Elka soil but have bedrock at a depth of 40 to 60 inches. Included areas are as much as 5 acres each in size and make up 15 to 25 percent of the unit.

Major soil properties—

Permeability: Moderate throughout the profile
Available water capacity: High
Soil reaction: Very strongly acid to moderately acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Rapid
Erosion hazard: Severe

Use.—Most areas of this soil are used as woodland.

Crops and pasture.—This soil is generally unsuited to cultivated crops and pasture. The stones on the surface, the slope, a short growing season, and erosion are the main management concerns.

Woodland.—The potential productivity of this soil for sugar maple is moderate. The slope limits the use of equipment.

Dwellings.—The slope is the main limitation. Special design and grading will help to overcome this limitation. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites. Quickly establishing a plant cover after construction also helps to control erosion.

Local roads and streets.—The slope is the main limitation. Special design and grading will help to overcome this limitation.

Septic tank absorption fields.—The restricted permeability and the slope are the main limitations. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which the effluent is absorbed. Installing the distribution lines on the contour and providing distribution boxes or other

structures that promote the even distribution of effluent will help to overcome the slope.

Capability classification.—VIIs

EmF—Elka channery loam, very steep, very stony. This soil is very deep and well drained. It is on the irregularly sloping sides of valleys at high elevations in the Catskill Mountains. It formed in glacial till derived from reddish sandstone and siltstone. Stones as much as 10 inches in diameter cover about 3 percent of the surface. Slopes range from 35 to 70 percent. Areas are irregular in shape and range from 5 to 200 acres in size.

Typically, the surface is covered by a layer of partly decomposed leaf litter about 3 inches thick. The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 8 inches, dark reddish brown channery loam that has 15 percent rock fragments

Subsoil:
- 8 to 14 inches, reddish brown channery loam that has 20 percent rock fragments
- 14 to 32 inches, reddish brown channery loam that has 25 percent rock fragments

Substratum:
- 32 to 60 inches, reddish brown channery very fine sandy loam that has 30 percent rock fragments

Inclusions.—Included with this soil in mapping are small areas of Lewbeach, Willowemoc, and Onteora soils on the top of knolls and in valleys. Also included are a few areas of the moderately deep Vly soils and the shallow Halcott soils and areas of soils that are similar to the Elka soil but have bedrock at a depth of 40 to 60 inches. Included areas are as much as 5 acres each in size and make up 15 to 25 percent of the unit.

Major soil properties—

Permeability: Moderate throughout the profile
Available water capacity: High
Soil reaction: Very strongly acid to moderately acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Very rapid
Erosion hazard: Very severe

Use.—Most areas of this soil are used as woodland.

Crops and pasture.—This soil is generally unsuited to cultivated crops and pasture. The stones on the surface, the slope, a short growing season, and erosion are the main management concerns.

Woodland.—The potential productivity of this soil for sugar maple is moderate. The slope limits the use of equipment.

Dwellings.—The slope is the main limitation. Special design and grading will help to overcome this limitation.

Local roads and streets.—The slope is the main limitation. Special design and grading will help to overcome this limitation.

Septic tank absorption fields.—The restricted permeability and the slope are the main limitations.

Capability classification.—VIIs

EnA—Elmridge very fine sandy loam, 0 to 3 percent slopes. This soil is very deep, nearly level, and moderately well drained. It is on the smoother parts of sandy ridges on glacial lake plains. It formed in sandy lacustrine material. Areas are irregular in shape and range from 5 to 120 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 9 inches, dark brown very fine sandy loam

Subsoil:
- 9 to 16 inches, yellowish brown fine sandy loam
- 16 to 21 inches, yellowish brown fine sandy loam that has light brownish gray mottles
- 21 to 28 inches, yellowish brown sandy loam that has light brownish gray mottles

Substratum:
- 28 to 60 inches, olive gray and olive brown silty clay that has light olive gray mottles

Inclusions.—Included with this soil in mapping are small areas of the somewhat poorly drained Shaker and Rhinebeck soils on the slightly lower parts of the plains. Also included are areas of the poorly drained and very poorly drained Madalin and Covington soils in depressions and shallow drainageways, areas of the shallow Nassau soils, areas of bedrock outcrop on the more sloping parts of the unit, and areas where the upper part of the soil has been stripped away for use as molding sand. Included areas are as much as 3 acres each in size and make up 15 to 20 percent of the unit.

Major soil properties—

Permeability: Moderately rapid in the surface layer and subsoil and slow or very slow in the substratum
Available water capacity: High
Soil reaction: Very strongly acid to slightly acid in the surface layer and subsoil and moderately acid to mildly alkaline in the substratum
Depth to the seasonal high water table: 1.5 to 3.0 feet (November through May)
Flooding: None

Depth to bedrock: More than 60 inches
Surface runoff: Slow
Erosion hazard: None

Use.—Most areas are used for cultivated crops. A few areas are used as pasture. This soil is classified as prime farmland.

Crops and pasture.—This soil is well suited to cultivated crops. Wetness delays planting in some years. Where the wetness is a limitation, subsurface drains will improve the suitability for crops. Properly managing crop residue and regularly adding other organic material will help to maintain tilth.

This soil is well suited to pasture. Wetness is a limitation. Deferment of grazing during wet periods will improve the quality of the forage. Rotation grazing, proper stocking rates, applications of fertilizer, and weed control will increase forage yields.

Woodland.—The potential productivity of this soil for eastern white pine is very high. Few or no limitations affect woodland management.

Dwellings.—Wetness is the main limitation, especially on sites for dwellings with basements. Grading the soil so that surface water moves away from the dwelling and installing interceptor drains to divert water from the higher adjacent areas will reduce the wetness. Installing drains around footings and foundations also will reduce the wetness.

Local roads and streets.—Low strength and the potential for frost action are the main limitations. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action and improve soil strength.

Septic tank absorption fields.—Wetness and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept runoff from the higher adjacent areas. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which the effluent is absorbed.

Capability classification.—IIw

EnB—Elmridge very fine sandy loam, 3 to 8 percent slopes. This soil is very deep, gently sloping, and moderately well drained. It is on the convex parts of sandy ridges on glacial lake plains. It formed in sandy lacustrine material. Areas are irregular in shape and range from 5 to 100 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 9 inches, dark brown very fine sandy loam

Subsoil:
9 to 16 inches, yellowish brown fine sandy loam
16 to 21 inches, yellowish brown fine sandy loam that has light brownish gray mottles
21 to 28 inches, yellowish brown sandy loam that has light brownish gray mottles

Substratum:
28 to 60 inches, olive gray and olive brown silty clay that has light olive gray mottles

Inclusions.—Included with this soil in mapping are small areas of the somewhat poorly drained Shaker and Rhinebeck soils on the slightly lower parts of the plains. Also included are areas of the poorly drained and very poorly drained Madalin and Covington soils in depressions and shallow drainageways, areas of the shallow Nassau soils, areas of bedrock outcrop on the more sloping parts of the unit, and areas where the upper part of the soil has been stripped away for use as molding sand. Included areas are as much as 3 acres each in size and make up 15 to 20 percent of the unit.

Major soil properties—

Permeability: Moderately rapid in the surface layer and subsoil and slow or very slow in the substratum
Available water capacity: High
Soil reaction: Very strongly acid to slightly acid in the surface layer and subsoil and moderately acid to mildly alkaline in the substratum
Depth to the seasonal high water table: 1.5 to 3.0 feet (November through May)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Slow
Erosion hazard: None or slight

Use.—Most areas are used for cultivated crops. A few areas are used as pasture. This soil is classified as prime farmland.

Crops and pasture.—This soil is well suited to cultivated crops. Wetness delays planting in some years. Where the wetness is a limitation, subsurface drains will improve the suitability for crops. Properly managing crop residue and regularly adding other organic material will help to maintain tilth.

This soil is well suited to pasture. Wetness is a limitation. Deferment of grazing during wet periods will improve the quality of the forage. Rotation grazing, proper stocking rates, applications of fertilizer, and weed control will increase forage yields.

Woodland.—The potential productivity of this soil for eastern white pine is very high. Few or no limitations affect woodland management.

Dwellings.—Wetness is the main limitation, especially

on sites for dwellings with basements. Grading the soil so that surface water moves away from the dwelling and installing interceptor drains to divert water from the higher adjacent areas will reduce the wetness. Installing drains around footings and foundations also will reduce the wetness.

Local roads and streets.—Low strength and the potential for frost action are the main limitations. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action and improve soil strength.

Septic tank absorption fields.—Wetness and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept runoff from the higher adjacent areas. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which the effluent is absorbed.

Capability classification.—IIw

FaC—Farmington gravelly silt loam, rolling, rocky. This soil is shallow and is somewhat excessively drained and well drained. It is on irregularly sloping, bedrock-controlled uplands, mainly on the limestone ridges parallel to the Hudson River. The soil formed in glacial till and is underlain by highly fractured, folded limestone. Exposed bedrock and ledges cover about 2 percent of the surface. Slopes range from 5 to 16 percent. Areas are long and narrow or irregular in shape and range from 5 to 200 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, dark brown gravelly silt loam that has 25 percent rock fragments
Subsoil:
8 to 13 inches, yellowish brown silt loam that has 10 percent rock fragments
Bedrock:
13 inches, gray, massive limestone

Inclusions.—Included with this soil in mapping are small areas of the well drained and moderately well drained Galway soils. These soils are in concave areas. They are deeper to bedrock than the Farmington soil. Also included are the somewhat excessively drained Nassau soils, areas along the sides of ridges where bedrock is within 10 inches of the surface, and areas that have a very stony or bouldery surface. Included areas are as much as 3 acres each in size and make up about 25 percent of the unit.

Major soil properties—

Permeability: Moderate throughout the profile
Available water capacity: Very low
Soil reaction: Strongly acid to slightly acid in the surface layer and moderately acid to mildly alkaline in the subsoil
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 10 to 20 inches
Surface runoff: Rapid
Erosion hazard: Severe

Use.—Most areas of this soil are used as woodland. Some areas are used as pasture.

Crops and pasture.—This soil is generally unsuited to cultivated crops and is poorly suited to pasture because of the erosion hazard, the depth to bedrock, and the rocks on the surface. Deferment of grazing during dry periods will improve the growth of forage species and reduce the hazard of erosion. Rotation grazing, applications of fertilizer, and weed control will help to keep the pasture in good condition.

Woodland.—The potential productivity of this soil for sugar maple is moderate. The depth to bedrock causes seedling mortality and windthrow.

Dwellings.—The depth to bedrock, which cannot be easily ripped, is the main limitation, especially on sites for dwellings with basements. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—The depth to bedrock is the main limitation. Adding fill and planning road locations and grades so that removal of the rock is not needed will minimize this limitation.

Septic tank absorption fields.—The depth to bedrock is the main limitation. A poor filtering capacity and contamination of the ground water are management concerns.

Capability classification.—VIs

FaD—Farmington gravelly silt loam, hilly, rocky. This soil is shallow and is somewhat excessively drained and well drained. It is on irregularly sloping, bedrock-controlled uplands, mainly on the limestone ridges parallel to the Hudson River. The soil formed in glacial till and is underlain by highly fractured, folded limestone. Exposed bedrock and ledges cover about 2 percent of the surface. Slopes range from 15 to 30 percent. Areas are long and narrow or irregular in shape and range from 5 to 200 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, dark brown gravelly silt loam that has 25 percent rock fragments
Subsoil:
8 to 13 inches, yellowish brown silt loam that has 10 percent rock fragments
Bedrock:
13 inches, gray, massive limestone

Inclusions.—Included with this soil in mapping are small areas of the well drained and moderately well drained Galway soils. These soils are in concave areas. They are deeper to bedrock than the Farmington soil. Also included are the somewhat excessively drained Nassau soils, areas along the sides of ridges where bedrock is within a depth of 10 inches, and areas that have a very stony or bouldery surface. Included areas are as much as 3 acres each in size and make up about 25 percent of the unit.

Major soil properties—

Permeability: Moderate throughout the profile
Available water capacity: Very low
Soil reaction: Strongly acid to slightly acid in the surface layer and moderately acid to mildly alkaline in the subsoil
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 10 to 20 inches
Surface runoff: Very rapid
Erosion hazard: Very severe

Use.—Most areas of this soil are used as woodland. Some areas are used as pasture.

Crops and pasture.—This soil is generally unsuited to cultivated crops and pasture because of the erosion hazard, the depth to bedrock, and the rocks on the surface.

Woodland.—The potential productivity of this soil for sugar maple is moderate. The depth to bedrock causes seedling mortality and windthrow. The slope limits the use of equipment.

Dwellings.—The slope and the depth to bedrock, which cannot be easily ripped, are the main limitations. The bedrock especially limits the soil as a site for dwellings with basements.

Local roads and streets.—The slope and the depth to bedrock are the main limitations. Adding fill and planning road locations and grades so that removal of the rock is not needed will help to overcome the depth to bedrock. Land shaping and grading will help to overcome the slope.

Septic tank absorption fields.—The slope and the depth to bedrock are the main limitations. A poor filtering capacity and contamination of the ground water are management concerns.

Capability classification.—VIs

FaE—Farmington gravelly silt loam, steep, rocky. This soil is shallow and is somewhat excessively drained and well drained. It is on irregularly sloping, bedrock-controlled uplands, mainly on the limestone ridges parallel to the Hudson River. The soil formed in glacial till and is underlain by highly fractured, folded limestone. Exposed bedrock and ledges cover about 2 percent of the surface. Slopes range from 25 to 35 percent. Areas are long and narrow or irregular in shape and range from 5 to 250 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, dark brown gravelly silt loam that has 25 percent rock fragments
Subsoil:
8 to 13 inches, yellowish brown silt loam that has 10 percent rock fragments
Bedrock:
13 inches, gray, massive limestone

Inclusions.—Included with this soil in mapping are small areas of the well drained and moderately well drained Galway soils. These soil are in concave areas. They are deeper to bedrock than the Farmington soil. Also included are the somewhat excessively drained Nassau soils, areas along the sides of ridges where bedrock is within a depth of 10 inches, and areas that have a very stony or bouldery surface. Included areas are as much as 3 acres each in size and make up about 25 percent of the unit.

Major soil properties—

Permeability: Moderate throughout the profile
Available water capacity: Very low
Soil reaction: Strongly acid to slightly acid in the surface layer and moderately acid to mildly alkaline in the subsoil
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 10 to 20 inches
Surface runoff: Very rapid
Erosion hazard: Very severe

Use.—Most areas of this soil are used as woodland.

Crops and pasture.—This soil is generally unsuited to cultivated crops and pasture because of the erosion hazard, the depth to bedrock, and the rocks on the surface.

Woodland.—The potential productivity of this soil for

sugar maple is moderate. The depth to bedrock causes seedling mortality and windthrow. The slope limits the use of equipment.

Dwellings.—The slope and the depth to bedrock, which cannot be easily ripped, are the main limitations. The bedrock especially limits the soil as a site for dwellings with basements.

Local roads and streets.—The slope and the depth to bedrock are the main limitations. Adding fill and planning road locations and grades so that removal of the rock is not needed will help to overcome the depth to bedrock. Land shaping and grading will help to overcome the slope.

Septic tank absorption fields.—The slope and the depth to bedrock are the main limitations. A poor filtering capacity and contamination of the ground water are management concerns.

Capability classification.—VIIs

Fu—Fluvaquents-Udifluvents complex, frequently flooded. This unit mainly consists of very deep, nearly level, very poorly drained to well drained soils formed in recent alluvial deposits on flood plains. The unit is commonly called alluvial land. The Fluvaquents are on the lower parts of the flood plains, and the Udifluvents are on the higher, better drained parts. Slopes range from 0 to 3 percent. Areas are about 55 percent Fluvaquents, 25 percent Udifluvents, and 20 percent other soils. These soils occur as areas so intermingled that it was not practical to map them separately.

Typically, the Fluvaquents have a surface layer that ranges from gravelly sand to silt loam. This layer is grayish or brownish and ranges from 6 to 15 inches in thickness. The substratum is mottled brownish or gray. It ranges from very gravelly sand to silt loam and extends to a depth of at least 60 inches.

Typically, the Udifluvents have a brown surface layer of silt loam to fine sandy loam. The substratum to a depth of at least 60 inches is brownish silt loam to sand. In some areas these soils are gravelly.

Inclusions.—Included in this unit in mapping are small areas of the poorly drained and very poorly drained Wayland soils and the moderately well drained Basher soils. Wayland soils are in low areas, and Basher soils are in the higher areas. Also included are areas of Carlisle soils and Medisaprists in depressions on the flood plains and small areas of gravel, sandbars, and rock outcrop. Included areas are as much as 3 acres each in size.

Major soil properties.—This unit has a wide range of properties, depending on the type of alluvium. In most areas, bedrock is at a depth of more than 5 feet and the soils are frequently flooded.

Use.—Most areas of this unit are used as pasture or woodland.

Crops and pasture.—Flooding is the main hazard affecting the use of this unit as cropland. In places gravel or cobblestones on the surface or gullied areas interfere with farming.

This unit is poorly suited to pasture. Access to the areas of the unit is poor. Rotation grazing, proper stocking rates, applications of fertilizer, and weed control will increase forage yields.

Woodland.—The potential productivity of this unit for trees is low. Most of the trees are brush or low-grade hardwoods.

Dwellings, local roads and streets, and septic tank absorption fields.—Because of flooding, this unit is generally unsuitable for these uses. Because of the wide range in soil properties, onsite investigation is necessary to determine the suitability of the unit for any use.

Capability classification.—Vw

GfB—Galway-Farmington gravelly silt loams, 2 to 8 percent slopes, rocky. This unit consists of gently sloping soils on the top of limestone ridges and hills. These soils formed in glacial till underlain by highly fractured, folded limestone bedrock. Rock outcrop covers about 2 percent of the surface. The Galway soil is on the concave, slightly lower parts of the unit. The Farmington soil is on the upper parts of the slopes. The slopes are smooth to undulating. Areas are long and narrow and range from 10 to 200 acres in size. They are about 40 percent moderately deep, well drained and moderately well drained Galway soil; 35 percent shallow, well drained and somewhat excessively drained Farmington soil; and 25 percent other soils and rock outcrop. The Galway and Farmington soils occur as areas so intermingled that it was not practical to separate them in mapping.

The typical sequence, depth, and composition of the layers of the Galway soil are as follows—

Surface layer:
0 to 9 inches, dark brown gravelly silt loam that has 20 percent rock fragments

Subsoil:
9 to 16 inches, strong brown gravelly silt loam that has 20 percent rock fragments
16 to 26 inches, yellowish brown silt loam that has 5 percent rock fragments

Bedrock:
26 inches, gray, massive limestone

The typical sequence, depth, and composition of the layers of the Farmington soil are as follows—

Surface layer:
0 to 8 inches, dark brown gravelly silt loam that has 25 percent rock fragments
Subsoil:
8 to 13 inches, yellowish brown silt loam that has 10 percent rock fragments
Bedrock:
13 inches, gray, massive limestone

Inclusions.—Included in this unit in mapping are small areas of soils that are similar to the Galway soil but are deeper to bedrock and soils that are similar to the Farmington soil but are less than 10 inches deep to bedrock. Also included are areas of the somewhat excessively drained Nassau soils and areas that have a very stony or bouldery surface. Included areas are as much as 3 acres each in size.

Major properties of the Galway soil—

Permeability: Moderate throughout the profile
Available water capacity: Low
Soil reaction: Moderately acid to neutral in the surface layer and moderately acid to mildly alkaline in the subsoil
Depth to the seasonal high water table: 1.5 to 3.0 feet (March and April)
Flooding: None
Depth to bedrock: 20 to 40 inches
Surface runoff: Medium
Erosion hazard: Moderate

Major properties of the Farmington soil—

Permeability: Moderate throughout the profile
Available water capacity: Very low
Soil reaction: Strongly acid to slightly acid in the surface layer and moderately acid to mildly alkaline in the subsoil
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 10 to 20 inches
Surface runoff: Medium
Erosion hazard: Moderate

Use.—Most areas of this unit are used as woodland. Some areas are used as pasture.

Crops and pasture.—This unit is generally unsuited to cultivated crops and poorly suited to pasture. The shallowness to bedrock, the rocks on the surface, and the available water capacity are the major limitations. Restricted grazing during droughty periods will improve the growth of forage species. Rotation grazing, proper stocking rates, applications of fertilizer, and weed control will help to keep the pasture in good condition.

Woodland.—The potential productivity of this unit for sugar maple is moderate. The depth to bedrock and the available water capacity in the Farmington soil cause seedling mortality. The depth to bedrock also causes windthrow.

Dwellings.—The depth to bedrock is the main limitation, especially on sites for dwellings with basements. Wetness in the Galway soil is an additional limitation. Fill material is needed to overcome the depth to bedrock, and drains around foundations will reduce the wetness. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—The depth to bedrock, the rock outcrop, and the wetness in the Galway soil are the main limitations. Fill material and special design will help to overcome the depth to bedrock. A drainage system and fill material will reduce the wetness.

Septic tank absorption fields.—The depth to bedrock in both soils and the wetness in the Galway soil are the main limitations. A poor filtering capacity and contamination of the ground water are management concerns.

Capability classification.—VIs

GfC—Galway-Farmington gravelly silt loams, rolling, rocky. This unit consists of soils on irregularly sloping limestone ridges and hills. These soils formed in glacial till underlain by highly fractured, folded limestone bedrock. The Galway soil is on the concave, slightly lower parts of the unit. The Farmington soil is on the upper parts of the slopes. The slopes are short and complex, and they range from 5 to 15 percent. Areas are long and narrow and range from 10 to 150 acres in size. They are about 45 percent moderately deep, well drained and moderately well drained Galway soil; 40 percent shallow, well drained and somewhat excessively drained Farmington soil; and 15 percent other soils and rock outcrop. The rock outcrop covers about 2 percent of the surface. The Galway and Farmington soils occur as areas so intermingled that it was not practical to separate them in mapping.

The typical sequence, depth, and composition of the layers of the Galway soil are as follows—

Surface layer:
0 to 9 inches, dark brown gravelly silt loam that has 20 percent rock fragments
Subsoil:
9 to 16 inches, strong brown gravelly silt loam that has 20 percent rock fragments
16 to 26 inches, yellowish brown silt loam that has 5 percent rock fragments
Bedrock:
26 inches, gray, massive limestone

The typical sequence, depth, and composition of the layers of the Farmington soil are as follows—

Surface layer:
0 to 8 inches, dark brown gravelly silt loam that has 25 percent rock fragments
Subsoil:
8 to 13 inches, yellowish brown silt loam that has 10 percent rock fragments
Bedrock:
13 inches, gray, massive limestone

Inclusions.—Included in this unit in mapping are small areas of soils that are similar to the Galway soil but are deeper to bedrock and soils that are similar to the Farmington soil but are less than 10 inches deep to bedrock. Also included are areas of the somewhat excessively drained Nassau soils and areas that have a very stony or bouldery surface. Included areas are as much as 3 acres each in size.

Major properties of the Galway soil—

Permeability: Moderate throughout the profile
Available water capacity: Low
Soil reaction: Moderately acid to neutral in the surface layer and moderately acid to mildly alkaline in the subsoil
Depth to the seasonal high water table: 1.5 to 3.0 feet (March and April)
Flooding: None
Depth to bedrock: 20 to 40 inches
Surface runoff: Rapid
Erosion hazard: Severe

Major properties of the Farmington soil—

Permeability: Moderate throughout the profile
Available water capacity: Very low
Soil reaction: Strongly acid to slightly acid in the surface layer and moderately acid to mildly alkaline in the subsoil
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 10 to 20 inches
Surface runoff: Rapid
Erosion hazard: Severe

Use.—Most areas of this unit are used as woodland. Some areas are used as pasture.

Crops and pasture.—This unit is generally unsuited to cultivated crops and poorly suited to pasture. The slope, the hazard of erosion, the shallowness to bedrock, the rocks on the surface, and the available water capacity are the major management concerns. Restricted grazing during droughty periods will improve the growth of forage species. Rotation grazing, proper stocking rates, applications of fertilizer, and weed control will help to keep the pasture in good condition.

Woodland.—The potential productivity of this unit for sugar maple is moderate. The depth to bedrock and the available water capacity in the Farmington soil cause seedling mortality. The depth to bedrock also causes windthrow.

Dwellings.—The slope and the depth to bedrock are the main limitations. The depth to bedrock is especially limiting on sites for dwellings with basements. Wetness in the Galway soil is an additional limitation. Fill material is needed to overcome the depth to bedrock, and drains around foundations will reduce the wetness. Land shaping and grading will help to overcome the slope. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—The depth to bedrock, the slope, the rock outcrop, and the wetness in the Galway soil are the main limitations. Fill material and special design will help to overcome the depth to bedrock. A drainage system and fill material will reduce the wetness. Grading and filling will help to overcome the slope.

Septic tank absorption fields.—The depth to bedrock in both soils and the wetness in the Galway soil are the main limitations. A poor filtering capacity and contamination of the ground water are management concerns.

Capability classification.—VIs

GfD—Galway-Farmington gravelly silt loams, hilly, rocky. This unit consists of soils on irregularly sloping limestone ridges and hills. These soils formed in glacial till underlain by highly fractured, folded limestone bedrock. The Galway soil is on the concave, slightly lower parts of the unit. The Farmington soil is on the upper parts of the slopes. The slopes are short and complex, and they range from 10 to 25 percent. Areas are long and narrow and range from 5 to 50 acres in size. They are about 45 percent moderately deep, well drained and moderately well drained Galway soil; 35 percent shallow, well drained and somewhat excessively drained Farmington soil; and 20 percent other soils and rock outcrop. The rock outcrop covers about 2 percent of the surface. The Galway and Farmington soils occur as areas so intermingled that it was not practical to separate them in mapping.

The typical sequence, depth, and composition of the layers of the Galway soil are as follows—

Surface layer:
0 to 9 inches, dark brown gravelly silt loam that has 20 percent rock fragments
Subsoil:
9 to 16 inches, strong brown gravelly silt loam that

has 20 percent rock fragments
16 to 26 inches, yellowish brown silt loam that has 5 percent rock fragments

Bedrock:
26 inches, gray, massive limestone

The typical sequence, depth, and composition of the layers of the Farmington soil are as follows—

Surface layer:
0 to 8 inches, dark brown gravelly silt loam that has 25 percent rock fragments

Subsoil:
8 to 13 inches, yellowish brown silt loam that has 10 percent rock fragments

Bedrock:
13 inches, gray, massive limestone

Inclusions.—Included in this unit in mapping are small areas of soils that are similar to the Galway soil but are deeper to bedrock and soils that are similar to the Farmington soil but are less than 10 inches deep to bedrock. Also included are areas of the somewhat excessively drained Nassau soils. Included areas are as much as 3 acres each in size.

Major properties of the Galway soil—

Permeability: Moderate throughout the profile
Available water capacity: Low
Soil reaction: Moderately acid to neutral in the surface layer and moderately acid to mildly alkaline in the subsoil
Depth to the seasonal high water table: 1.5 to 3.0 feet (March and April)
Flooding: None
Depth to bedrock: 20 to 40 inches
Surface runoff: Very rapid
Erosion hazard: Very severe

Major properties of the Farmington soil—

Permeability: Moderate throughout the profile
Available water capacity: Very low
Soil reaction: Strongly acid to slightly acid in the surface layer and moderately acid to mildly alkaline in the subsoil
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 10 to 20 inches
Surface runoff: Very rapid
Erosion hazard: Very severe

Use.—Most areas of this unit are used as woodland. Some areas are used as pasture.

Crops and pasture.—This unit is generally unsuited to cultivated crops and poorly suited to pasture. The slope, the hazard of erosion, the shallowness to bedrock, the rocks on the surface, and the available water capacity are the major management concerns. Restricted grazing during droughty periods will improve the growth of forage species. Rotation grazing, proper stocking rates, applications of fertilizer, and weed control will help to keep the pasture in good condition.

Woodland.—The potential productivity of this unit for sugar maple is moderate. The depth to bedrock and the available water capacity in the Farmington soil cause seedling mortality. The depth to bedrock also causes windthrow. Erosion is a hazard, and the slope limits the use of equipment.

Dwellings.—The slope and the depth to bedrock are the main limitations. The depth to bedrock is especially limiting on sites for dwellings with basements. Wetness in the Galway soil is an additional limitation. Fill material is needed to overcome the depth to bedrock, and drains around foundations will reduce the wetness. Land shaping and grading will help to overcome the slope. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—The depth to bedrock, the slope, the rock outcrop, and the wetness in the Galway soil are the main limitations. Fill material and special design will help to overcome the depth to bedrock. A drainage system and fill material will reduce the wetness. Grading and filling will help to overcome the slope.

Septic tank absorption fields.—The depth to bedrock in both soils, the wetness in the Galway soil, and the slope of both soils are the main limitations. A poor filtering capacity and contamination of the ground water are management concerns.

Capability classification.—VIs

HaB—Halcott channery silt loam, 3 to 8 percent slopes. This soil is shallow, gently sloping, and somewhat excessively drained to moderately well drained. It is on the smoother parts of ledges and plateaus in bedrock-controlled areas of the Catskill Mountains. The soil formed in channery glacial till underlain by shale, sandstone, and siltstone. Areas are long and narrow or irregular in shape and range from 5 to 200 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 5 inches, dark reddish brown channery silt loam that has 30 percent rock fragments

Subsoil:
5 to 13 inches, dark reddish brown and dark red

very channery silt loam that has 60 percent rock fragments

Bedrock:

13 inches, dark reddish brown, thinly bedded sandstone

Inclusions.—Included with this soil in mapping are small areas of the somewhat poorly drained and poorly drained Tor soils in shallow depressions. Also included are soils that are less than 10 inches deep to bedrock, soils that have stones and boulders on the surface, and the moderately deep Vly soils on the top of plateaus. Included areas are as much as 3 acres each in size and make up about 25 percent of the unit.

Major soil properties—

Permeability: Moderate throughout the profile
Available water capacity: Very low
Soil reaction: Extremely acid to strongly acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 10 to 20 inches
Surface runoff: Medium
Erosion hazard: Moderate

Use.—Most areas of this soil are used as pasture. Some areas are used for cultivated crops, and some are used as woodland.

Crops and pasture.—This soil is poorly suited to cultivated crops because of the very low available water capacity and the shallowness to bedrock. Properly managing crop residue and regularly adding other organic material will conserve soil moisture. Contour farming or stripcropping and a conservation tillage system that leaves crop residue on the surface after planting will help to control erosion and increase the amount of available water in the soil.

This soil is moderately suited to pasture. The limitations in pastured areas are the same as those that affect cultivated crops. Restricted grazing during droughty periods will improve the growth of forage species and reduce the hazard of erosion. Rotation grazing, proper stocking rates, applications of fertilizer, and weed control will help to keep the pasture in good condition.

Woodland.—The potential productivity of this soil for northern red oak is moderate. The depth to bedrock and the available water capacity cause seedling mortality. The depth to bedrock also causes windthrow.

Dwellings.—The depth to hard bedrock is the main limitation, especially on sites for dwellings with basements. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—The depth to bedrock is the main limitation. Planning road locations and grades so that removal of the rock is not needed and adding fill material will minimize this limitation.

Septic tank absorption fields.—The depth to bedrock is the main limitation. A poor filtering capacity, contamination of the ground water, and hillside seepage are management concerns.

Capability classification.—IVs

HaC—Halcott channery silt loam, 8 to 15 percent slopes. This soil is shallow, strongly sloping, and somewhat excessively drained to moderately well drained. It is on the benches and plateaus in bedrock-controlled areas of the Catskill Mountains. The soil formed in channery glacial till underlain by shale, sandstone, and siltstone. Areas are long and narrow and range from 5 to 200 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 5 inches, dark reddish brown channery silt loam that has 30 percent rock fragments

Subsoil:

5 to 13 inches, dark reddish brown and dark red very channery silt loam that has 60 percent rock fragments

Bedrock:

13 inches, dark reddish brown, thinly bedded sandstone

Inclusions.—Included with this soil in mapping are small areas of the somewhat poorly drained and poorly drained Tor soils in shallow depressions. Also included are soils that are less than 10 inches deep to bedrock, soils that have stones and boulders on the surface, and the moderately deep Vly soils on the top of plateaus. Included areas are as much as 3 acres each in size and make up about 20 percent of the unit.

Major soil properties—

Permeability: Moderate throughout the profile
Available water capacity: Very low
Soil reaction: Extremely acid to strongly acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 10 to 20 inches
Surface runoff: Medium
Erosion hazard: Severe

Use.—Most areas of this soil are used as pasture. Some areas are used as woodland.

Crops and pasture.—This soil is generally unsuited to cultivated crops and poorly suited to pasture. The erosion hazard, the very low available water capacity, and the shallowness to bedrock are the main limitations. Restricted grazing during droughty periods will improve the growth of forage species and reduce the hazard of erosion. Rotation grazing, proper stocking rates, applications of fertilizer, and weed control will help to keep the pasture in good condition.

Woodland.—The potential productivity of this soil for northern red oak is moderate. The depth to bedrock and the available water capacity cause seedling mortality. The depth to bedrock also causes windthrow.

Dwellings.—The depth to hard bedrock is the main limitation, especially on sites for dwellings with basements. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—The depth to bedrock is the main limitation. Planning road locations and grades so that removal of the rock is not needed and adding fill material will minimize this limitation.

Septic tank absorption fields.—The depth to bedrock is the main limitation. A poor filtering capacity, contamination of the ground water, and hillside seepage are management concerns.

Capability classification.—VIe

HIC—Halcott-Vly complex, rolling. This unit is on eroded, rounded hills in areas where the soils are underlain by interbedded sandstone and shale. The Halcott soil is on the upper parts of the slopes, and the Vly soil is on the lower parts. Slopes range from 5 to 16 percent. Areas are irregular in shape and range from 5 to 200 acres in size. They are about 45 percent shallow, somewhat excessively drained to moderately well drained Halcott soil; 35 percent moderately deep, well drained and somewhat excessively drained Vly soil; and 20 percent other soils. The Halcott and Vly soils were mapped together because they occur as closely intermingled areas on the landscape.

Typically, the surface of the Halcott soil is covered by a layer of slightly decomposed leaf litter about 1 inch thick. The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 5 inches, dark reddish brown channery silt loam that has 30 percent rock fragments

Subsoil:
- 5 to 13 inches, dark reddish brown and dark red very channery silt loam that has 60 percent rock fragments

Bedrock:
- 13 inches, dark reddish brown, thinly bedded sandstone

The typical sequence, depth, and composition of the layers of the Vly soil are as follows—

Surface layer:
- 0 to 2 inches, dusky red channery silt loam that has 25 percent rock fragments

Subsoil:
- 2 to 11 inches, reddish brown very channery loam that has 35 percent rock fragments
- 11 to 21 inches, reddish brown very channery loam that has 60 percent rock fragments
- 21 to 28 inches, reddish brown very channery loam that has yellowish red mottles and 60 percent rock fragments

Bedrock:
- 28 inches, dark reddish brown, thinly bedded sandstone

Inclusions.—Included in this unit in mapping are small areas of the somewhat poorly drained and poorly drained Tor soils in shallow depressions. Also included are soils that are less than 10 inches deep to bedrock, areas of bedrock outcrops and ledges, areas that have stones and boulders on the surface, and areas of the very deep Lewbeach and Willowemoc soils on the top of plateaus. Included areas are as much as 3 acres each in size.

Major properties of the Halcott soil—

Permeability: Moderate throughout the profile
Available water capacity: Very low
Soil reaction: Extremely acid to strongly acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 10 to 20 inches
Surface runoff: Medium
Erosion hazard: Severe

Major properties of the Vly soil—

Permeability: Moderate throughout the profile
Available water capacity: Very low
Soil reaction: Extremely acid to strongly acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 20 to 40 inches
Surface runoff: Medium
Erosion hazard: Moderate

Use.—Most areas of this unit are used as pasture or meadow. Some areas are used as woodland.

Crops and pasture.—This unit is generally unsuited to cultivated crops and poorly suited to pasture. The very low available water capacity, the shallowness to bedrock, and the severe erosion hazard are the main management concerns. Restricted grazing during droughty periods will improve the growth of forage species and reduce the hazard of erosion. Rotation grazing, proper stocking rates, applications of fertilizer, and weed control will help to keep the pasture in good condition.

Woodland.—The potential productivity is moderate for northern red oak on the Halcott soil and for sugar maple on the Vly soil. The depth to bedrock and the available water capacity in the Halcott soil cause seedling mortality. The depth to bedrock also causes windthrow.

Dwellings.—The depth to bedrock is the main limitation, especially on sites for dwellings with basements. Adding fill material will help to overcome this limitation. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—The depth to bedrock in the Halcott soil is the main limitation. The slope, the potential for frost action, and the depth to bedrock in the Vly soil are additional limitations. Planning road locations will help to overcome the depth to bedrock. A coarse grained subgrade will reduce the potential for frost action. Special design will help to overcome the slope.

Septic tank absorption fields.—The depth to bedrock is the main limitation on sites for conventional septic tank absorption fields. A poor filtering capacity, contamination of the ground water, and hillside seepage are management concerns.

Capability classification.—VIe

HlD—Halcott-Vly complex, 15 to 25 percent slopes. This unit is in eroded areas where the soils are underlain by interbedded sandstone and shale. Areas are irregular in shape and range from 5 to 150 acres in size. They are about 60 percent shallow, somewhat excessively drained to moderately well drained Halcott soil; 20 percent moderately deep, well drained and somewhat excessively drained Vly soil; and 20 percent other soils. The Halcott and Vly soils were mapped together because they occur as closely intermingled areas on the landscape.

Typically, the surface of the Halcott soil is covered by a layer of slightly decomposed leaf litter about 1 inch thick. The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 5 inches, dark reddish brown channery silt loam that has 30 percent rock fragments

Subsoil:
5 to 13 inches, dark reddish brown and dark red very channery silt loam that has 60 percent rock fragments

Bedrock:
13 inches, dark reddish brown, thinly bedded sandstone

The typical sequence, depth, and composition of the layers of the Vly soil are as follows—

Surface layer:
0 to 2 inches, dusky red channery silt loam that has 25 percent rock fragments

Subsoil:
2 to 11 inches, reddish brown very channery loam that has 35 percent rock fragments
11 to 21 inches, reddish brown very channery loam that has 60 percent rock fragments
21 to 28 inches, reddish brown very channery loam that has yellowish red mottles and 60 percent rock fragments

Bedrock:
28 inches, dark reddish brown, thinly bedded sandstone

Inclusions.—Included in this unit in mapping are small areas of the somewhat poorly drained and poorly drained Tor soils in shallow depressions. Also included are soils that are less than 10 inches deep to bedrock, areas of bedrock outcrops and ledges, areas that have stones and boulders on the surface, and areas of the very deep Lewbeach and Willowemoc soils on the top of plateaus. Included areas are as much as 3 acres each in size.

Major properties of the Halcott soil—

Permeability: Moderate throughout the profile
Available water capacity: Very low
Soil reaction: Extremely acid to strongly acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 10 to 20 inches
Surface runoff: Rapid
Erosion hazard: Severe

Major properties of the Vly soil—

Permeability: Moderate throughout the profile
Available water capacity: Very low
Soil reaction: Extremely acid to strongly acid throughout the profile

Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 20 to 40 inches
Surface runoff: Rapid
Erosion hazard: Severe

Use.—Most areas of this unit are used as woodland. Some areas are used as pasture or meadow.

Crops and pasture.—This unit is generally unsuited to cultivated crops and pasture. The very low available water capacity, the shallowness to bedrock, and the severe erosion hazard are the main management concerns.

Woodland.—The potential productivity is moderate for northern red oak on the Halcott soil and for sugar maple on the Vly soil. The depth to bedrock and the available water capacity in the Halcott soil cause seedling mortality. The depth to bedrock also causes windthrow. The slope limits the use of equipment.

Dwellings.—The slope and the depth to bedrock are the main limitations. The depth to bedrock is especially limiting on sites for dwellings with basements. Adding fill material will help to overcome the depth to bedrock. Special design helps to overcome the slope. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—The depth to bedrock in the Halcott soil and the slope are the main limitations. Planning road locations will help to overcome the depth to bedrock. Special design will help to overcome the slope.

Septic tank absorption fields.—The depth to bedrock and the slope are the main limitations. A poor filtering capacity, contamination of the ground water, and hillside seepage are management concerns.

Capability classification.—VIIe

HIE—Halcott-Vly complex, 25 to 45 percent slopes. This unit is in steep, eroded areas where the soils are underlain by interbedded sandstone and shale. Areas are irregular in shape and range from 5 to 150 acres in size. They are about 60 percent shallow, somewhat excessively drained to moderately well drained Halcott soil; 20 percent moderately deep, well drained and somewhat excessively drained Vly soil; and 20 percent other soils. The Halcott and Vly soils were mapped together because they occur as closely intermingled areas on the landscape.

Typically, the surface of the Halcott soil is covered by a layer of slightly decomposed leaf litter about 1 inch thick. The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 5 inches, dark reddish brown channery silt loam that has 30 percent rock fragments

Subsoil:
- 5 to 13 inches, dark reddish brown and dark red very channery silt loam that has 60 percent rock fragments

Bedrock:
- 13 inches, dark reddish brown, thinly bedded sandstone

The typical sequence, depth, and composition of the layers of the Vly soil are as follows—

Surface layer:
- 0 to 2 inches, dusky red channery silt loam that has 25 percent rock fragments

Subsoil:
- 2 to 11 inches, reddish brown very channery loam that has 35 percent rock fragments
- 11 to 21 inches, reddish brown very channery loam that has 60 percent rock fragments
- 21 to 28 inches, reddish brown very channery loam that has yellowish red mottles and 60 percent rock fragments

Bedrock:
- 28 inches, dark reddish brown, thinly bedded sandstone

Inclusions.—Included in this unit in mapping are small areas of the somewhat poorly drained and poorly drained Tor soils in shallow depressions. Also included are soils that are less than 10 inches deep to bedrock, areas of bedrock outcrops and ledges, areas that have stones and boulders on the surface, and areas of the very deep Lewbeach and Willowemoc soils on the top of plateaus. Included areas are as much as 3 acres each in size.

Major properties of the Halcott soil—

Permeability: Moderate throughout the profile
Available water capacity: Very low
Soil reaction: Extremely acid to strongly acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 10 to 20 inches
Surface runoff: Very rapid
Erosion hazard: Very severe

Major properties of the Vly soil—

Permeability: Moderate throughout the profile
Available water capacity: Very low
Soil reaction: Extremely acid to strongly acid throughout the profile

Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 20 to 40 inches
Surface runoff: Very rapid
Erosion hazard: Very severe

Use.—Most areas of this unit are used as woodland. Some areas are used as pasture or meadow.

Crops and pasture.—This unit is generally unsuited to cultivated crops and pasture. The very low available water capacity, the shallowness to bedrock, and the erosion hazard are the main management concerns.

Woodland.—The potential productivity is moderate for northern red oak on the Halcott soil and for sugar maple on the Vly soil. The depth to bedrock and the available water capacity in the Halcott soil cause seedling mortality. The depth to bedrock also causes windthrow. The slope limits the use of equipment.

Dwellings.—The slope and the depth to bedrock are the main limitations. The depth to bedrock is especially limiting on sites for dwellings with basements.

Local roads and streets.—The depth to bedrock in the Halcott soil and the slope are the main limitations. Planning road locations will help to overcome the depth to bedrock. Special design will help to overcome the slope.

Septic tank absorption fields.—The depth to bedrock and the slope are the main limitations. A poor filtering capacity, contamination of the ground water, and hillside seepage are management concerns.

Capability classification.—VIIe

HvB—Hudson and Vergennes soils, 3 to 8 percent slopes. This unit consists of very deep, gently sloping, moderately well drained soils on the smoother parts of lake plains near the Hudson River. These soils formed in lacustrine deposits of silt and clay. Slopes are smooth and convex. Areas are long and narrow and range from 5 to 150 acres in size. The total acreage of the unit is about 40 percent Hudson soil, 35 percent Vergennes soil, and 25 percent other soils. Some areas consist mainly of Hudson soil, some mainly of Vergennes soil, and some of both soils. These soils were mapped together because they are used and managed in similar ways.

The typical sequence, depth, and composition of the layers of the Hudson soil are as follows—

Surface layer:
0 to 4 inches, dark brown silt loam
Subsurface layer:
4 to 8 inches, pale brown silt loam
Subsoil:
8 to 13 inches, brown silty clay loam that has pale brown coatings
13 to 21 inches, olive brown, firm silty clay loam that has yellowish brown and light brownish gray mottles
21 to 25 inches, light olive brown, firm silty clay loam that has olive yellow mottles
25 to 30 inches, light olive brown silty clay
Substratum:
30 to 60 inches, light olive brown silty clay

The typical sequence, depth, and composition of the layers of the Vergennes soil are as follows—

Surface layer:
0 to 10 inches, dark brown loam
Subsurface layer:
10 to 17 inches, grayish brown clay loam
Subsoil:
17 to 26 inches, brown, firm clay that has pale brown coatings and light olive brown mottles
26 to 34 inches, brown, firm clay that has light brownish gray, dark yellowish brown, and strong brown mottles
Substratum:
34 to 47 inches, variegated grayish brown, light yellowish brown, and dark brown, firm silty clay
47 to 60 inches, variegated grayish brown, light yellowish brown, and brown, varved silty clay and silty clay loam

Inclusions.—Included in this unit in mapping are small areas of the poorly drained Covington and poorly drained and very poorly drained Madalin soils in shallow drainageways and depressions. Also included are areas of the somewhat poorly drained Kingsbury and Rhinebeck soils on the slightly lower parts of the landscape, the moderately well drained Elmridge soils, the somewhat poorly drained Shaker soils, and the shallow Nassau soils. Included areas are as much as 5 acres each in size.

Major properties of the Hudson soil—

Permeability: Moderate or moderately slow in the surface layer and slow or very slow below the surface layer
Available water capacity: High
Soil reaction: Strongly acid to neutral in the surface layer and subsurface layer, moderately acid to mildly alkaline in the subsoil, and neutral to moderately alkaline in the substratum
Depth to the seasonal high water table: 1 to 2 feet (November through April)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Medium
Erosion hazard: Moderate

Major properties of the Vergennes soil—

Permeability: Slow or moderately slow in the surface layer and slow or very slow below the surface layer
Available water capacity: Moderate
Soil reaction: Strongly acid to neutral in the surface layer and subsoil and neutral to moderately alkaline in the substratum
Depth to the seasonal high water table: 1 to 3 feet (December through May)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Medium
Erosion hazard: Moderate

Use.—Most areas of this unit are used for cultivated crops or pasture. A few areas are used as woodland.

Crops and pasture.—This unit is well suited to cultivated crops. Wetness delays planting in some years. The surface layer becomes cloddy if it is tilled when too wet. A combination of closely spaced subsurface drains and surface ditches will reduce the wetness. Contour farming or stripcropping and a conservation tillage system that leaves crop residue on the surface after planting will help to control erosion. Properly managing crop residue and regularly adding other organic material will improve tilth.

This unit is well suited to pasture. The seasonal wetness and the erosion hazard are management concerns. The clayey texture limits trafficability. Deferment of grazing during wet periods will help to maintain the quality of the forage and will help to prevent damage to and compaction of the soil. Rotation grazing, proper stocking rates, applications of fertilizer, and weed control will increase forage yields.

Woodland.—The potential productivity is moderately high for northern red oak on the Hudson soil and high for eastern white pine on the Vergennes soil. The clayey texture of the Vergennes soil causes seedling mortality and restricts the use of equipment.

Dwellings.—Wetness is the main limitation on sites for dwellings with basements. Surface drains around the dwellings and interceptor drains that divert water from the higher adjacent areas will reduce the wetness. Drains installed around footings and backfilled with sand and gravel will lower the water table. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites. Quickly establishing a plant cover after construction also helps to control erosion.

Local roads and streets.—The potential for frost action and low strength are the main limitations. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action and improve soil strength.

Septic tank absorption fields.—Wetness and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept surface runoff. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which the effluent is absorbed.

Capability classification.—IIe

HvC—Hudson and Vergennes soils, 8 to 15 percent slopes. This unit consists of very deep, strongly sloping, moderately well drained soils on ridges and side slopes on lake plains near the Hudson River. Many areas are dissected by drainageways. These soils formed in lacustrine deposits of silt and clay. Slopes are smooth and convex. Areas are long and narrow and range from 5 to 150 acres in size. The total acreage of the unit is about 40 percent Hudson soil, 40 percent Vergennes soil, and 20 percent other soils. Some areas consist mainly of Hudson soil, some mainly of Vergennes soil, and some of both soils. These soils were mapped together because they are used and managed in similar ways.

The typical sequence, depth, and composition of the layers of the Hudson soil are as follows—

Surface layer:
0 to 4 inches, dark brown silt loam
Subsurface layer:
4 to 8 inches, pale brown silt loam
Subsoil:
8 to 13 inches, brown silty clay loam that has pale brown coatings
13 to 21 inches, olive brown, firm silty clay loam that has yellowish brown and light brownish gray mottles
21 to 25 inches, light olive brown, firm silty clay loam that has olive yellow mottles
25 to 30 inches, light olive brown silty clay
Substratum:
30 to 60 inches, light olive brown silty clay

The typical sequence, depth, and composition of the layers of the Vergennes soil are as follows—

Surface layer:
0 to 10 inches, dark brown loam
Subsurface layer:
10 to 17 inches, grayish brown clay loam
Subsoil:
17 to 26 inches, brown, firm clay that has pale brown coatings and light olive brown mottles
26 to 34 inches, brown, firm clay that has light brownish gray, dark yellowish brown, and strong brown mottles

Substratum:

34 to 47 inches, variegated grayish brown, light yellowish brown, and dark brown, firm silty clay

47 to 60 inches, variegated grayish brown, light yellowish brown, and brown, varved silty clay and silty clay loam

Inclusions.—Included in this unit in mapping are small areas of the poorly drained Covington and poorly drained and very poorly drained Madalin soils in shallow drainageways and depressions. Also included are areas of the somewhat poorly drained Kingsbury and Rhinebeck soils on the slightly lower parts of the landscape, the moderately well drained Elmridge soils, the somewhat poorly drained Shaker soils, and the shallow Nassau soils. Many included areas, especially those adjacent to drainageways, are severely eroded. Included areas are as much as 5 acres each in size.

Major properties of the Hudson soil—

Permeability: Moderate or moderately slow in the surface layer and slow or very slow below the surface layer
Available water capacity: High
Soil reaction: Strongly acid to neutral in the surface layer and subsurface layer, moderately acid to mildly alkaline in the subsoil, and neutral to moderately alkaline in the substratum
Depth to the seasonal high water table: 1 to 2 feet (November through April)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Rapid
Erosion hazard: Severe

Major properties of the Vergennes soil—

Permeability: Slow or moderately slow in the surface layer and slow or very slow below the surface layer
Available water capacity: Moderate
Soil reaction: Strongly acid to neutral in the surface layer and subsoil and neutral to moderately alkaline in the substratum
Depth to the seasonal high water table: 1 to 3 feet (December through May)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Rapid
Erosion hazard: Severe

Use.—Most areas of this unit are used for cultivated crops or pasture. A few areas are used as woodland.

Crops and pasture.—This unit is moderately suited to cultivated crops. The slope and the hazard of erosion are the major management concerns. Wetness delays planting in some years. The surface layer becomes cloddy if it is tilled when too wet. A combination of closely spaced subsurface drains and surface ditches will reduce the wetness. Contour farming or stripcropping, a conservation tillage system that leaves crop residue on the surface after planting, and a cropping system that includes close-growing crops will help to control erosion. Properly managing crop residue and regularly adding other organic material will improve tilth.

This unit is well suited to pasture. The seasonal wetness and the erosion hazard are management concerns. The clayey texture limits trafficability. Deferment of grazing during wet periods will help to maintain the quality of the forage and will help to prevent damage to and compaction of the soil. Rotation grazing, proper stocking rates, applications of fertilizer, and weed control will increase forage yields.

Woodland.—The potential productivity is moderately high for northern red oak on the Hudson soil and high for eastern white pine on the Vergennes soil. The clayey texture of the Vergennes soil causes seedling mortality and restricts the use of equipment.

Dwellings.—Wetness is the main limitation on sites for dwellings with basements. Surface drains around the dwellings and interceptor drains that divert water from the higher adjacent areas will reduce the wetness. Drains installed around footings and backfilled with sand and gravel will lower the water table. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites. Quickly establishing a plant cover after construction also helps to control erosion.

Local roads and streets.—The potential for frost action and low strength are the main limitations. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action and improve soil strength.

Septic tank absorption fields.—Wetness and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept surface runoff. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which the effluent is absorbed.

Capability classification.—IIIe

HvE—Hudson and Vergennes soils, 25 to 50 percent slopes. This unit consists of very deep, very steep, moderately well drained soils on side slopes and escarpment faces on lake plains near the Hudson River. Many areas are dissected by drainageways. These soils formed in lacustrine deposits of silt and clay. Slopes are

convex. Areas are long and narrow and range from 5 to 150 acres in size. The total acreage of the unit is about 45 percent Hudson soil, 40 percent Vergennes soil, and 15 percent other soils. Some areas consist mainly of Hudson soil, some mainly of Vergennes soil, and some of both soils. These soils were mapped together because they are used and managed in similar ways.

The typical sequence, depth, and composition of the layers of the Hudson soil are as follows—

Surface layer:
0 to 4 inches, dark brown silt loam
Subsurface layer:
4 to 8 inches, pale brown silt loam
Subsoil:
8 to 13 inches, brown silty clay loam that has pale brown coatings
13 to 21 inches, olive brown, firm silty clay loam that has yellowish brown and light brownish gray mottles
21 to 25 inches, light olive brown, firm silty clay loam that has olive yellow mottles
25 to 30 inches, light olive brown silty clay
Substratum:
30 to 60 inches, light olive brown silty clay

The typical sequence, depth, and composition of the layers of the Vergennes soil are as follows—

Surface layer:
0 to 10 inches, dark brown loam
Subsurface layer:
10 to 17 inches, grayish brown clay loam
Subsoil:
17 to 26 inches, brown, firm clay that has pale brown coatings and light olive brown mottles
26 to 34 inches, brown, firm clay that has light brownish gray, dark yellowish brown, and strong brown mottles
Substratum:
34 to 47 inches, variegated grayish brown, light yellowish brown, and dark brown, firm silty clay
47 to 60 inches, variegated grayish brown, light yellowish brown, and brown, varved silty clay and silty clay loam

Inclusions.—Included in this unit in mapping are small areas of the poorly drained Covington and poorly drained and very poorly drained Madalin soils in shallow drainageways and depressions. Also included are areas of the somewhat poorly drained Kingsbury and Rhinebeck soils on the slightly lower parts of the landscape, the moderately well drained Elmridge soils, the somewhat poorly drained Shaker soils, and the shallow Nassau soils. Many included areas, especially those adjacent to drainageways, are severely eroded. Included areas are as much as 5 acres each in size.

Major properties of the Hudson soil—

Permeability: Moderate or moderately slow in the surface layer and slow or very slow below the surface layer
Available water capacity: High
Soil reaction: Strongly acid to neutral in the surface layer and subsurface layer, moderately acid to mildly alkaline in the subsoil, and neutral to moderately alkaline in the substratum
Depth to the seasonal high water table: 1 to 2 feet (November through April)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Very rapid
Erosion hazard: Very severe

Major properties of the Vergennes soil—

Permeability: Slow or moderately slow in the surface layer and slow or very slow below the surface layer
Available water capacity: Moderate
Soil reaction: Strongly acid to neutral in the surface layer and subsoil and neutral to moderately alkaline in the substratum
Depth to the seasonal high water table: 1 to 3 feet (December through May)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Very rapid
Erosion hazard: Very severe

Use.—Most areas of this unit are used as woodland.

Crops and pasture.—This unit is generally unsuited to cultivated crops and pasture. The slope and the hazard of erosion are the major management concerns. Wetness and the clayey texture are additional limitations.

Woodland.—The potential productivity is moderately high for northern red oak on the Hudson soil and high for eastern white pine on the Vergennes soil. The clayey texture of the Vergennes soil causes seedling mortality and, along with the slope of both soils, restricts the use of equipment.

Dwellings.—The slope and wetness are the main limitations.

Local roads and streets.—The slope, the potential for frost action, and low strength are the main limitations. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action and improve soil strength. Grading and land shaping will help to overcome the slope.

Septic tank absorption fields.—The slope, wetness, and the restricted permeability are the main limitations. Seepage is a hazard.

Capability classification.—VIIe

HwC3—Hudson and Vergennes silty clay loams, 8 to 15 percent slopes, severely eroded. This unit consists of very deep, strongly sloping, moderately well drained soils on side slopes on lake plains near the Hudson River. Many areas are dissected by drainageways. These soils formed in lacustrine deposits of silt and clay. Slopes are mainly smooth and convex, but some are irregular and are crossed by drainageways. Areas are long and narrow and range from 5 to 100 acres in size. The total acreage of the unit is about 40 percent Hudson soil, 35 percent Vergennes soil, and 25 percent other soils. Some areas consist mainly of Hudson soil, some mainly of Vergennes soil, and some of both soils. These soils were mapped together because they are used and managed in similar ways.

The typical sequence, depth, and composition of the layers of the Hudson soil are as follows—

Surface layer:
- 0 to 7 inches, dark brown silty clay loam

Subsoil:
- 7 to 21 inches, olive brown, firm silty clay loam that has yellowish brown and light brownish gray mottles
- 21 to 25 inches, light olive brown, firm silty clay loam that has olive yellow mottles
- 25 to 30 inches, light olive brown silty clay

Substratum:
- 30 to 60 inches, light olive brown silty clay

The typical sequence, depth, and composition of the layers of the Vergennes soil are as follows—

Surface layer:
- 0 to 6 inches, dark brown silty clay loam

Subsoil:
- 6 to 26 inches, brown, firm clay that has pale brown coatings and strong brown mottles
- 26 to 34 inches, brown, firm clay that has light brownish gray, dark yellowish brown, and strong brown mottles

Substratum:
- 34 to 47 inches, variegated grayish brown, light yellowish brown, and dark brown, firm silty clay
- 47 to 60 inches, variegated grayish brown, light yellowish brown, and brown, varved silty clay and silty clay loam

Inclusions.—Included in this unit in mapping are small areas of the poorly drained Covington and poorly drained and very poorly drained Madalin soils in shallow drainageways and depressions. Also included are areas of the somewhat poorly drained Kingsbury and Rhinebeck soils on the slightly lower parts of the landscape, the moderately well drained Elmridge soils, the somewhat poorly drained Shaker soils, and the shallow Nassau soils. Included areas are as much as 5 acres each in size.

Major properties of the Hudson soil—

Permeability: Moderate or moderately slow in the surface layer and slow or very slow below the surface layer
Available water capacity: High
Soil reaction: Strongly acid to neutral in the surface layer, moderately acid to mildly alkaline in the subsoil, and neutral to moderately alkaline in the substratum
Depth to the seasonal high water table: 1 to 2 feet (November through April)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Very rapid
Erosion hazard: Severe

Major properties of the Vergennes soil—

Permeability: Slow or moderately slow in the surface layer and slow or very slow below the surface layer
Available water capacity: Moderate
Soil reaction: Strongly acid to neutral in the surface layer and subsoil and neutral to moderately alkaline in the substratum
Depth to the seasonal high water table: 1 to 3 feet (December through May)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Very rapid
Erosion hazard: Severe

Use.—Most areas of this unit are used as woodland. A few areas are used as pasture.

Crops and pasture.—This unit is poorly suited to cultivated crops. The slope and the hazard of erosion are the major management concerns. Wetness and the clayey texture are additional limitations. Subsurface drains will reduce the wetness in seepy areas. Close-growing crops will help to control erosion. Properly managing crop residue and regularly adding other organic material will improve tilth.

This unit is moderately suited to pasture. The seasonal wetness and the erosion hazard are management concerns. The clayey texture limits trafficability. Deferment of grazing during wet periods will help to maintain the quality of the forage and will

help to prevent damage to and compaction of the soil. Rotation grazing, proper stocking rates, applications of fertilizer, and weed control will increase forage yields.

Woodland.—The potential productivity is moderately high for northern red oak on the Hudson soil and high for eastern white pine on the Vergennes soil. The clayey texture of the Vergennes soil causes seedling mortality and restricts the use of equipment.

Dwellings.—Wetness is the main limitation on sites for dwellings with basements. Surface drains around the dwellings and interceptor drains that divert water from the higher adjacent areas will reduce the wetness. Drains installed around footings and backfilled with sand and gravel will lower the water table. Maintaining the plant cover and using temporary erosion-control structures will reduce the hazards of erosion, gullying, and slumping on construction sites. Quickly establishing a plant cover after construction also helps to control erosion.

Local roads and streets.—The potential for frost action and low strength are the main limitations. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action and improve soil strength.

Septic tank absorption fields.—Wetness and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept surface runoff. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which the effluent is absorbed.

Capability classification.—IVe

HwD3—Hudson and Vergennes silty clay loams, 15 to 25 percent slopes, severely eroded. This unit consists of very deep, moderately steep, moderately well drained soils on side slopes and escarpments on lake plains near the Hudson River. These soils formed in lacustrine deposits of silt and clay. Slopes are mainly smooth and convex, but some are short and irregular and are crossed by drainageways. Areas are long and narrow and range from 5 to 100 acres in size. The total acreage of the unit is about 40 percent Hudson soil, 40 percent Vergennes soil, and 20 percent other soils. Some areas consist mainly of Hudson soil, some mainly of Vergennes soil, and some of both soils. These soils were mapped together because they are used and managed in similar ways.

The typical sequence, depth, and composition of the layers of the Hudson soil are as follows—

Surface layer:
0 to 7 inches, dark brown silty clay loam

Subsoil:
7 to 21 inches, olive brown, firm silty clay loam that has yellowish brown and light brownish gray mottles
21 to 25 inches, light olive brown, firm silty clay loam that has olive yellow mottles
25 to 30 inches, light olive brown silty clay

Substratum:
30 to 60 inches, light olive brown silty clay

The typical sequence, depth, and composition of the layers of the Vergennes soil are as follows—

Surface layer:
0 to 6 inches, dark brown silty clay loam

Subsoil:
6 to 26 inches, brown, firm clay that has pale brown coatings and strong brown mottles
26 to 34 inches, brown, firm clay that has light brownish gray, dark yellowish brown, and strong brown mottles

Substratum:
34 to 47 inches, variegated grayish brown, light yellowish brown, and dark brown, firm silty clay
47 to 60 inches, variegated grayish brown, light yellowish brown, and brown, varved silty clay and silty clay loam

Inclusions.—Included in this unit in mapping are small areas of the poorly drained Covington and poorly drained and very poorly drained Madalin soils in shallow drainageways and depressions. Also included are areas of the somewhat poorly drained Kingsbury and Rhinebeck soils on the slightly lower parts of the landscape, the moderately well drained Elmridge soils, the somewhat poorly drained Shaker soils, and the shallow Nassau soils. Included areas are as much as 5 acres each in size.

Major properties of the Hudson soil—

Permeability: Moderate or moderately slow in the surface layer and slow or very slow below the surface layer
Available water capacity: High
Soil reaction: Strongly acid to neutral in the surface layer, moderately acid to mildly alkaline in the subsoil, and neutral to moderately alkaline in the substratum
Depth to the seasonal high water table: 1 to 2 feet (November through April)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Very rapid
Erosion hazard: Very severe

Major properties of the Vergennes soil—

Permeability: Slow or moderately slow in the surface layer and slow or very slow below the surface layer
Available water capacity: Moderate
Soil reaction: Strongly acid to neutral in the surface layer and subsoil and neutral to moderately alkaline in the substratum
Depth to the seasonal high water table: 1 to 3 feet (December through May)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Very rapid
Erosion hazard: Very severe

Use.—Most areas of this unit are used as woodland.

Crops and pasture.—This unit is generally unsuited to cultivated crops and poorly suited to pasture. The slope and the hazard of erosion are the major management concerns. Wetness and the clayey texture are additional limitations. Deferment of grazing during wet periods will help to maintain the quality of the forage and will help to prevent damage to and compaction of the soil. Rotation grazing, proper stocking rates, applications of fertilizer, and weed control will increase forage yields.

Woodland.—The potential productivity is moderately high for northern red oak on the Hudson soil and high for eastern white pine on the Vergennes soil. The clayey texture of the Vergennes soil causes seedling mortality and restricts the use of equipment.

Dwellings.—Wetness and the slope are the main limitations on sites for dwellings with basements. Installing surface drains around the dwellings and filling with sand and gravel will reduce the wetness. Drains installed around footings and backfilled with sand and gravel will lower the water table. Special design will help to overcome the slope. Maintaining the plant cover and using temporary erosion-control structures will reduce the hazards of erosion, gullying, and slumping on construction sites. Quickly establishing a plant cover after construction also helps to control erosion.

Local roads and streets.—The slope, the potential for frost action, and low strength are the main limitations. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action and improve soil strength. Land shaping and grading will help to overcome the slope.

Septic tank absorption fields.—The slope, wetness, and the restricted permeability are the main limitations. Seepage is a hazard.

Capability classification.—VIe

KrA—Kingsbury and Rhinebeck soils, 0 to 3 percent slopes. This unit consists of very deep, somewhat poorly drained, nearly level soils on lake plains near the Hudson River. These soils are on the smooth parts of ridges and along drainageways. They formed in lacustrine and marine deposits of silt and clay. Slopes are generally smooth and convex. Areas are long and narrow and range from 5 to 200 acres in size. The total acreage of the unit is about 40 percent Kingsbury soil, 35 percent Rhinebeck soil, and 25 percent other soils. Some areas consist mainly of Kingsbury soil, some mainly of Rhinebeck soil, and some of both. These soils were mapped together because they are used and managed in similar ways.

The typical sequence, depth, and composition of the layers of the Kingsbury soil are as follows—

Surface layer:
0 to 7 inches, dark grayish brown clay loam
Subsurface layer:
7 to 9 inches, pale brown silty clay loam that has strong brown mottles
Subsoil:
9 to 14 inches, brown, firm clay that has pale brown ped faces and strong brown mottles
14 to 23 inches, dark grayish brown, firm clay that has grayish brown ped faces and brown mottles
23 to 36 inches, dark grayish brown, firm clay that has gray ped faces and brown and dark grayish brown mottles
Substratum:
36 to 70 inches, gray, yellowish brown, and reddish gray silty clay loam that has varves of silt loam and very fine sandy loam

The typical sequence, depth, and composition of the layers of the Rhinebeck soil are as follows—

Surface layer:
0 to 7 inches, dark brown silt loam
Subsurface layer:
7 to 11 inches, brown silty clay loam that has strong brown and gray mottles
Subsoil:
11 to 19 inches, dark yellowish brown silty clay loam that has light brownish gray mottles
19 to 32 inches, brown, firm silty clay that has light brownish gray and dark brown mottles
Substratum:
32 to 60 inches, yellowish brown, firm silty clay that has light gray and very dark gray mottles

Inclusions.—Included in this unit in mapping are small areas of the poorly drained Covington and poorly drained and very poorly drained Madalin soils in shallow drainageways and depressions. Also included are the moderately well drained Hudson and Vergennes soils in dissected areas and along escarpments and the moderately well drained Elmridge and somewhat poorly

drained Shaker soils in areas where sand overlies the clayey sediments. Included areas are as much as 5 acres each in size.

Major properties of the Kingsbury soil—

Permeability: Slow in the surface layer and very slow below the surface layer
Available water capacity: High
Soil reaction: Strongly acid to neutral in the surface layer and subsurface layer, strongly acid to mildly alkaline in the subsoil, and mildly alkaline or moderately alkaline in the substratum
Depth to the seasonal high water table: 6 inches to 1.5 feet (December through May)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Slow
Erosion hazard: Slight

Major properties of the Rhinebeck soil—

Permeability: Moderately slow in the surface layer and subsurface layer and slow below the subsurface layer
Available water capacity: High
Soil reaction: Strongly acid to neutral in the surface layer, strongly acid to mildly alkaline in the subsoil, and slightly acid to moderately alkaline in the substratum
Depth to the seasonal high water table: 6 inches to 1.5 feet (January through May)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Slow
Erosion hazard: Slight

Use.—Most areas of this unit are used for cultivated crops or pasture. Some areas are used as woodland.

Crops and pasture.—This unit is moderately suited to cultivated crops. Seasonal wetness is the main limitation. The content of clay also is a limitation. Clods form on the surface if the soils are tilled when they are too wet. A combination of surface ditches and closely spaced subsurface drains will reduce the wetness. Properly managing crop residue and adding other organic material will improve tilth and minimize clodding. A conservation tillage system that leaves crop residue on the surface after planting will reduce the hazard of erosion.

This unit is well suited to pasture. Wetness is a limitation. Deferment of grazing during wet periods will improve the growth of forage species and help to prevent damage to the pasture. Rotation grazing, proper stocking rates, applications of fertilizer, and weed control will increase forage yields.

Woodland.—The potential productivity of this unit for red maple is moderate. The seasonal wetness and content of clay in the Kingsbury soil limit the rooting depth and cause a windthrow hazard. Seasonal wetness in both soils and the content of clay make the surface layer soft and unable to support heavy equipment.

Dwellings.—Seasonal wetness and the shrink-swell potential are the main limitations on sites for dwellings with basements. Subsurface drains around the foundations and upslope interceptor drains that divert runoff from the higher adjacent areas will help to remove surface water. Drains installed around footings and backfilled with sand and gravel will lower the water table. Reinforcing footings and foundations and backfilling with sand and gravel will minimize the structural damage caused by shrinking and swelling.

Local roads and streets.—Low strength, the potential for frost action, and wetness are the main limitations. Raised fill of coarse grained material to frost depth will reduce the potential for frost action and wetness and will improve soil strength.

Septic tank absorption fields.—Wetness and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept runoff from the higher adjacent areas. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which effluent is absorbed.

Capability classification.—IIIw

KrB—Kingsbury and Rhinebeck soils, 3 to 8 percent slopes. This unit consists of very deep, somewhat poorly drained, gently sloping soils on lake plains near the Hudson River. These soils are on ridges and along drainageways. They formed in lacustrine and marine deposits of silt and clay. Areas are irregular in shape and range from 5 to 100 acres in size. The total acreage of the unit is about 40 percent Kingsbury soil, 40 percent Rhinebeck soil, and 20 percent other soils. Some areas consist mainly of Kingsbury soil, some mainly of Rhinebeck soil, and some of both. These soils were mapped together because they are used and managed in similar ways.

The typical sequence, depth, and composition of the layers of the Kingsbury soil are as follows—

Surface layer:
0 to 7 inches, dark grayish brown clay loam
Subsurface layer:
7 to 9 inches, pale brown silty clay loam that has strong brown mottles

Subsoil:
- 9 to 14 inches, brown, firm clay that has pale brown ped faces and strong brown mottles
- 14 to 23 inches, dark grayish brown, firm clay that has grayish brown ped faces and brown mottles
- 23 to 36 inches, dark grayish brown, firm clay that has gray ped faces and brown and dark grayish brown mottles

Substratum:
- 36 to 70 inches, gray, yellowish brown, and reddish gray silty clay loam that has varves of silt loam and very fine sandy loam

The typical sequence, depth, and composition of the layers of the Rhinebeck soil are as follows—

Surface layer:
- 0 to 7 inches, dark brown silt loam

Subsurface layer:
- 7 to 11 inches, brown silty clay loam that has strong brown and gray mottles

Subsoil:
- 11 to 19 inches, dark yellowish brown silty clay loam that has light brownish gray mottles
- 19 to 32 inches, brown, firm silty clay that has light brownish gray and dark brown mottles

Substratum:
- 32 to 60 inches, yellowish brown, firm silty clay that has light gray and very dark gray mottles

Inclusions.—Included in this unit in mapping are small areas of the poorly drained Covington and poorly drained and very poorly drained Madalin soils in shallow drainageways and depressions. Also included are the moderately well drained Hudson and Vergennes soils in dissected areas and along escarpments and the moderately well drained Elmridge and somewhat poorly drained Shaker soils in areas where sand overlies the clayey sediments. Included areas are as much as 5 acres each in size.

Major properties of the Kingsbury soil—

Permeability: Slow in the surface layer and very slow below the surface layer
Available water capacity: High
Soil reaction: Strongly acid to neutral in the surface layer and subsurface layer, strongly acid to mildly alkaline in the subsoil, and mildly alkaline or moderately alkaline in the substratum
Depth to the seasonal high water table: 6 inches to 1.5 feet (December through May)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Medium
Erosion hazard: Moderate

Major properties of the Rhinebeck soil—

Permeability: Moderately slow in the surface layer and subsurface layer and slow below the subsurface layer
Available water capacity: High
Soil reaction: Strongly acid to neutral in the surface layer, strongly acid to mildly alkaline in the subsoil, and slightly acid to moderately alkaline in the substratum
Depth to the seasonal high water table: 6 inches to 1.5 feet (January through May)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Medium
Erosion hazard: Moderate

Use.—Most areas of this unit are used for cultivated crops or pasture. Some areas are used as woodland.

Crops and pasture.—This unit is moderately suited to cultivated crops. Seasonal wetness and erosion are the main management concerns. The content of clay also is a limitation. Clods form on the surface if the soils are tilled when they are too wet. A combination of surface ditches and closely spaced subsurface drains will reduce the wetness. Properly managing crop residue and adding other organic material will improve tilth and minimize clodding. Contour farming or stripcropping and a conservation tillage system that leaves crop residue on the surface after planting will reduce the hazard of erosion. Properly managing crop residue and adding other organic material will help to maintain tilth and minimize clodding.

This unit is well suited to pasture. Wetness and erosion are management concerns. Deferment of grazing during wet periods will improve the growth of forage species and help to prevent damage to the pasture. Rotation grazing, proper stocking rates, applications of fertilizer, and weed control will increase forage yields.

Woodland.—The potential productivity of this unit for sugar maple is moderate. The seasonal wetness and content of clay in the Kingsbury soil limit the rooting depth and cause a windthrow hazard. Seasonal wetness in both soils and the content of clay make the surface layer soft and unable to support heavy equipment.

Dwellings.—Seasonal wetness and the shrink-swell potential are the main limitations on sites for dwellings with basements. Subsurface drains around the foundations and upslope interceptor drains that divert runoff from the higher adjacent areas will help to remove surface water. Drains installed around footings and backfilled with sand and gravel will lower the water table. Reinforcing footings and foundations and

backfilling with sand and gravel will minimize the structural damage caused by shrinking and swelling.

Local roads and streets.—Low strength, the potential for frost action, and wetness are the main limitations. Raised fill of coarse grained material to frost depth will reduce the potential for frost action and wetness and will improve soil strength.

Septic tank absorption fields.—Wetness and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept runoff from the higher adjacent areas. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which effluent is absorbed.

Capability classification.—IIIw

LaB—Lackawanna channery loam, 3 to 8 percent slopes. This soil is very deep, gently sloping, and well drained. It is on ridges on mountainous uplands. It formed in firm glacial till derived from reddish sandstone, siltstone, and shale. Slopes are generally smooth and convex. Areas are long and narrow and range from 5 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 3 inches, dark brown channery loam that has 20 percent rock fragments

Subsoil:

3 to 14 inches, brown channery loam that has 20 percent rock fragments

14 to 26 inches, reddish brown and dark reddish brown channery loam that has 20 percent rock fragments

26 to 30 inches, brown channery loam that has 25 percent rock fragments

30 to 60 inches, a fragipan of reddish brown, very firm, dense and brittle channery loam that has pinkish gray mottles

Inclusions.—Included with this soil in mapping are small areas of the moderately well drained Wellsboro soils on the slightly lower parts of the landscape and the somewhat poorly drained Morris soils in seepy spots and along shallow drainageways. Also included are areas of the shallow Arnot soils and the moderately deep Oquaga soils. Included areas are as much as 5 acres each in size and make up about 25 percent of the unit.

Major soil properties—

Permeability: Moderate above the fragipan and slow in the fragipan

Available water capacity: Moderate

Soil reaction: Very strongly acid or strongly acid above the fragipan and very strongly acid to moderately acid in the fragipan

Depth to the seasonal high water table: 2 to 6 feet (November through March)

Flooding: None

Depth to bedrock: More than 60 inches

Surface runoff: Medium

Erosion hazard: Slight

Use.—Most areas are used for hay or pasture. Some areas are used for cultivated crops. This soil is classified as prime farmland.

Crops and pasture.—This soil is well suited to cultivated crops. A conservation tillage system that leaves crop residue on the surface after planting will help to control erosion. Properly managing crop residue and adding other organic material will help to maintain tilth.

This soil is well suited to pasture. Rotation grazing, proper stocking rates, weed control, and applications of fertilizer will increase forage yields.

Woodland.—The potential productivity of this soil for northern red oak is moderately high. Few or no limitations affect woodland management.

Dwellings.—Wetness is the main limitation, especially on sites for dwellings with basements. Grading so that surface water moves away from the dwellings and installing interceptor drains that divert water from the higher adjacent areas will reduce the wetness. Installing drains around footings and foundations and sealing the foundations also will reduce the wetness.

Local roads and streets.—Wetness and the potential for frost action are the main limitations. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action. Raised fill material and a drainage system will reduce the wetness.

Septic tank absorption fields.—Wetness and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept runoff from the higher adjacent areas. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which effluent is absorbed.

Capability classification.—IIe

LaC—Lackawanna channery loam, 8 to 15 percent slopes. This soil is very deep, strongly sloping, and well drained. It is on the top and sides of ridges on mountainous uplands. It formed in firm glacial till derived from reddish sandstone, siltstone, and shale. Slopes are generally smooth and convex. Areas are

long and narrow and range from 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 3 inches, dark brown channery loam that has 20 percent rock fragments

Subsoil:
- 3 to 14 inches, brown channery loam that has 20 percent rock fragments
- 14 to 26 inches, reddish brown and dark reddish brown channery loam that has 20 percent rock fragments
- 26 to 30 inches, brown channery loam that has 25 percent rock fragments
- 30 to 60 inches, a fragipan of reddish brown, very firm, dense and brittle channery loam that has pinkish gray mottles

Inclusions.—Included with this soil in mapping are small areas of the moderately well drained Wellsboro soils on the slightly lower parts of the landscape and the somewhat poorly drained Morris soils in seepy spots and along shallow drainageways. Also included are areas of the shallow Arnot soils and the moderately deep Oquaga soils. Included areas are as much as 5 acres each in size and make up about 20 percent of the unit.

Major soil properties—

Permeability: Moderate above the fragipan and slow in the fragipan
Available water capacity: Moderate
Soil reaction: Very strongly acid or strongly acid above the fragipan and very strongly acid to moderately acid in the fragipan
Depth to the seasonal high water table: 2 to 6 feet (November through March)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Medium
Erosion hazard: Moderate

Use.—Most areas of this soil are used for hay or pasture. Some areas are used for cultivated crops, and a few are used as woodland.

Crops and pasture.—This soil is moderately suited to cultivated crops. Erosion is the main hazard. Contour farming or stripcropping and a conservation tillage system that leaves crop residue on the surface after planting will help to control erosion. Properly managing crop residue and adding other organic material will help to maintain tilth.

This soil is well suited to pasture. Rotation grazing, proper stocking rates, weed control, and applications of fertilizer will increase forage yields.

Woodland.—The potential productivity of this soil for northern red oak is moderately high. Few or no limitations affect woodland management.

Dwellings.—Wetness is the main limitation, especially on sites for dwellings with basements. Grading so that surface water moves away from the dwellings and installing interceptor drains that divert water from the higher adjacent areas will reduce the wetness. Installing drains around footings and foundations and sealing the foundations also will reduce the wetness. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss during construction.

Local roads and streets.—Wetness, the slope, and the potential for frost action are the main limitations. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action. Raised fill material and a drainage system will reduce the wetness. Land shaping or grading will help to overcome the slope.

Septic tank absorption fields.—Wetness and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept runoff from the higher adjacent areas. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which effluent is absorbed.

Capability classification.—IIIe

LaD—Lackawanna channery loam, 15 to 25 percent slopes. This soil is very deep, moderately steep, and well drained. It is on the top and sides of ridges on mountainous uplands. It formed in firm glacial till derived from reddish sandstone, siltstone, and shale. Slopes are generally smooth and convex. Areas are oval or long and narrow and range from 5 to 100 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 3 inches, dark brown channery loam that has 20 percent rock fragments

Subsoil:
- 3 to 14 inches, brown channery loam that has 20 percent rock fragments
- 14 to 26 inches, reddish brown and dark reddish brown channery loam that has 20 percent rock fragments
- 26 to 30 inches, brown channery loam that has 25 percent rock fragments
- 30 to 60 inches, a fragipan of reddish brown, very

firm, dense and brittle channery loam that has pinkish gray mottles

Inclusions.—Included with this soil in mapping are small areas of the moderately well drained Wellsboro soils on the slightly lower parts of the landscape and the somewhat poorly drained Morris soils in seepy spots and along shallow drainageways. Also included are areas of the shallow Arnot soils and the moderately deep Oquaga soils. Included areas are as much as 5 acres each in size and make up about 15 percent of the unit.

Major soil properties—

Permeability: Moderate above the fragipan and slow in the fragipan
Available water capacity: Moderate
Soil reaction: Very strongly acid or strongly acid above the fragipan and very strongly acid to moderately acid in the fragipan
Depth to the seasonal high water table: 2 to 6 feet (November through March)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Rapid
Erosion hazard: Severe

Use.—Most areas of this soil are used for hay or pasture. Some areas are used for cultivated crops or woodland.

Crops and pasture.—This soil is poorly suited to cultivated crops. Erosion is the main hazard. A crop rotation dominated by close-growing crops, contour farming or stripcropping, and a conservation tillage system that leaves crop residue on the surface after planting will help to control erosion. Properly managing crop residue and adding other organic material will help to maintain tilth.

This soil is moderately suited to pasture. Erosion is the main hazard. Rotation grazing, proper stocking rates, weed control, and applications of fertilizer will increase forage yields.

Woodland.—The potential productivity of this soil for northern red oak is moderately high. The slope limits the use of equipment.

Dwellings.—Wetness and the slope are the main limitations, especially on sites for dwellings with basements. Installing drains around footings and foundations and sealing the foundations will reduce the wetness. Special design helps to overcome the slope. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss during construction.

Local roads and streets.—The slope is the main limitation. Special design and land shaping or grading will help to overcome this limitation.

Septic tank absorption fields.—Wetness, the slope, and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept runoff from the higher adjacent areas. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which effluent is absorbed. Installing the distribution lines on the contour and providing drop boxes will increase the efficiency of the system.

Capability classification.—IVe

LaE—Lackawanna channery loam, 25 to 35 percent slopes. This soil is very deep, steep, and well drained. It is on the top and sides of ridges on mountainous uplands. It formed in firm glacial till derived from reddish sandstone, siltstone, and shale. Slopes are generally smooth and convex. Areas are long and narrow and range from 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 3 inches, dark brown channery loam that has 20 percent rock fragments
Subsoil:
3 to 14 inches, brown channery loam that has 20 percent rock fragments
14 to 26 inches, reddish brown and dark reddish brown channery loam that has 20 percent rock fragments
26 to 30 inches, brown channery loam that has 25 percent rock fragments
30 to 60 inches, a fragipan of reddish brown, very firm, dense and brittle channery loam that has pinkish gray mottles

Inclusions.—Included with this soil in mapping are small areas of the moderately well drained Wellsboro soils on the slightly lower parts of the landscape and the somewhat poorly drained Morris soils in seepy spots and along shallow drainageways. Also included are areas of the shallow Arnot soils and the moderately deep Oquaga soils. Included areas are as much as 5 acres each in size and make up about 15 percent of the unit.

Major soil properties—

Permeability: Moderate above the fragipan and slow in the fragipan
Available water capacity: Moderate
Soil reaction: Very strongly acid or strongly acid above the fragipan and very strongly acid to moderately acid in the fragipan

Depth to the seasonal high water table: 2 to 6 feet (November through March)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Very rapid
Erosion hazard: Very severe

Use.—Most areas of this soil are used as woodland. Some areas are used as pasture.

Crops and pasture.—This soil is generally unsuited to cultivated crops and poorly suited to pasture. Erosion is the main hazard. Rotation grazing, proper stocking rates, weed control, and applications of fertilizer will increase forage yields.

Woodland.—The potential productivity of this soil for northern red oak is moderately high. The slope limits the use of equipment.

Dwellings.—Wetness and the slope are the main limitations, especially on sites for dwellings with basements.

Local roads and streets.—The slope is the main limitation. Special design and land shaping or grading will help to overcome this limitation.

Septic tank absorption fields.—Wetness, the slope, and the restricted permeability are the main limitations.

Capability classification.—VIe

LcC—Lackawanna and Wellsboro channery loams, 3 to 15 percent slopes, very stony. This unit consists of very deep, gently sloping to strongly sloping soils on hilltops and hillsides in the foothills of the Catskill Mountains. The soils formed in firm glacial till derived from reddish sandstone, siltstone, and shale. Stones as much as 24 inches in diameter cover as much as 3 percent of the surface. Slopes are generally convex, but many are irregular. Areas are irregular in shape and range from 10 to 150 acres in size. The total acreage of the unit is about 50 percent Lackawanna soil, 25 percent Wellsboro soil, and 25 percent other soils. Some areas consist mainly of well drained Lackawanna soil, some mainly of moderately well drained Wellsboro soil, and some of both. The soils were mapped together because they are used and managed in similar ways.

The typical sequence, depth, and composition of the layers of the Lackawanna soil are as follows—

Surface layer:
0 to 3 inches, dark brown channery loam that has 20 percent rock fragments
Subsoil:
3 to 14 inches, brown channery loam that has 20 percent rock fragments
14 to 26 inches, reddish brown and dark reddish brown channery loam that has 20 percent rock fragments
26 to 30 inches, brown channery loam that has 25 percent rock fragments
30 to 60 inches, a fragipan of reddish brown, very firm, dense and brittle channery loam that has pinkish gray mottles

The typical sequence, depth, and composition of the layers of the Wellsboro soil are as follows—

Surface layer:
0 to 8 inches, dark brown channery loam that has 15 percent rock fragments
Subsoil:
8 to 11 inches, brown channery silt loam that has 15 percent rock fragments
11 to 16 inches, brown channery silt loam that has 20 percent rock fragments
16 to 20 inches, reddish brown channery silt loam that has strong brown mottles and 25 percent rock fragments
20 to 60 inches, a fragipan of reddish brown, very firm and dense, channery silt loam that has pinkish gray and strong brown mottles and 25 percent rock fragments

Inclusions.—Included in this unit in mapping are small areas of the somewhat poorly drained Morris soils in seepy spots and along shallow drainageways. Also included are the poorly drained and very poorly drained Alden soils in depressions, the shallow Arnot and moderately deep Oquaga soils in areas where the deposits of glacial till are thinner, and eroded areas. Included areas are as much as 5 acres each in size.

Major properties of the Lackawanna soil—

Permeability: Moderate above the fragipan and slow in the fragipan
Available water capacity: Moderate
Soil reaction: Very strongly acid or strongly acid above the fragipan and very strongly acid to moderately acid in the fragipan
Depth to the seasonal high water table: 2 to 6 feet (November through March)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Medium
Erosion hazard: Moderate

Major properties of the Wellsboro soil—

Permeability: Moderate above the fragipan and slow in the fragipan
Available water capacity: Moderate
Soil reaction: Very strongly acid to moderately acid throughout the profile

Depth to the seasonal high water table: 1 to 3 feet (November through March)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Medium
Erosion hazard: Moderate

Use.—Most areas of this unit are used as woodland. Some areas are used as pasture.

Crops and pasture.—This unit is generally unsuited to cultivated crops and poorly suited to pasture. The stones on the surface interfere with tillage and harvesting, and erosion is a hazard. Rotation grazing, proper stocking rates, weed control, and applications of fertilizer will increase forage yields and reduce the hazard of erosion.

Woodland.—The potential productivity of this unit for northern red oak is moderately high. Few or no limitations affect woodland management.

Dwellings.—Wetness is the main limitation, especially on sites for dwellings with basements. It can be reduced by installing subsurface drains and backfilling with sand and gravel. Foundation drains and interceptor drains that divert runoff will remove surface water. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss during construction.

Local roads and streets.—Wetness, the slope, and the potential for frost action are the main limitations. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action. Raised fill material and a drainage system will reduce the wetness. Special design will help to overcome the slope.

Septic tank absorption fields.—Wetness and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept runoff from the higher adjacent areas. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which effluent is absorbed.

Capability classification.—VIs

LcD—Lackawanna and Wellsboro channery loams, 15 to 25 percent slopes, very stony. This unit consists of very deep, gently sloping to strongly sloping soils on hilltops and hillsides in the foothills of the Catskill Mountains. The soils formed in firm glacial till derived from reddish sandstone, siltstone, and shale. Stones as much as 24 inches in diameter cover as much as 3 percent of the surface. Slopes are generally convex, but many are irregular. Areas are irregular in shape and range from 10 to 150 acres in size. The total acreage of the unit is about 55 percent Lackawanna soil, 25 percent Wellsboro soil, and 20 percent other soils. Some areas consist mainly of well drained Lackawanna soil, some mainly of moderately well drained Wellsboro soil, and some of both. The soils were mapped together because they are used and managed in similar ways.

The typical sequence, depth, and composition of the layers of the Lackawanna soil are as follows—

Surface layer:
- 0 to 3 inches, dark brown channery loam that has 20 percent rock fragments

Subsoil:
- 3 to 14 inches, brown channery loam that has 20 percent rock fragments
- 14 to 26 inches, reddish brown and dark reddish brown channery loam that has 20 percent rock fragments
- 26 to 30 inches, brown channery loam that has 25 percent rock fragments
- 30 to 60 inches, a fragipan of reddish brown, very firm, dense and brittle channery loam that has pinkish gray mottles

The typical sequence, depth, and composition of the layers of the Wellsboro soil are as follows—

Surface layer:
- 0 to 8 inches, dark brown channery loam that has 15 percent rock fragments

Subsoil:
- 8 to 11 inches, brown channery silt loam that has 15 percent rock fragments
- 11 to 16 inches, brown channery silt loam that has 20 percent rock fragments
- 16 to 20 inches, reddish brown channery silt loam that has strong brown mottles and 25 percent rock fragments
- 20 to 60 inches, a fragipan of reddish brown, very firm and dense, channery silt loam that has pinkish gray and strong brown mottles and 25 percent rock fragments

Inclusions.—Included in this unit in mapping are small areas of the somewhat poorly drained Morris soils in seepy spots and along shallow drainageways. Also included are the poorly drained and very poorly drained Alden soils in depressions, the shallow Arnot and moderately deep Oquaga soils in areas where the deposits of glacial till are thinner, and eroded areas. Included areas are as much as 5 acres each in size.

Major properties of the Lackawanna soil—

Permeability: Moderate above the fragipan and slow in the fragipan
Available water capacity: Moderate

Soil reaction: Very strongly acid or strongly acid above the fragipan and very strongly acid to moderately acid in the fragipan
Depth to the seasonal high water table: 2 to 6 feet (November through March)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Rapid
Erosion hazard: Severe

Major properties of the Wellsboro soil—

Permeability: Moderate above the fragipan and slow in the fragipan
Available water capacity: Moderate
Soil reaction: Very strongly acid to moderately acid throughout the profile
Depth to the seasonal high water table: 1 to 3 feet (November through March)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Rapid
Erosion hazard: Severe

Use.—Most areas of this unit are used as woodland. Some areas are used as pasture.

Crops and pasture.—This unit is generally unsuited to cultivated crops and pasture. The stones on the surface interfere with tillage and harvesting, and erosion is a hazard.

Woodland.—The potential productivity of this unit for northern red oak is moderately high. The slope limits the use of equipment.

Dwellings.—Wetness and the slope are the main limitations, especially on sites for dwellings with basements. The wetness can be reduced by installing subsurface drains and backfilling with sand and gravel. Special design helps to overcome the slope. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss during construction.

Local roads and streets.—The slope is the main limitation. Special design and grading or filling will help to overcome this limitation.

Septic tank absorption fields.—Wetness, the slope, and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept runoff from the higher adjacent areas. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which effluent is absorbed. Installing the distribution lines on the contour and providing drop boxes or similar structures will improve the efficiency of the system.

Capability classification.—VIIs

LeB—Lewbeach channery silt loam, 3 to 8 percent slopes. This soil is very deep, gently sloping, and well drained. It is on hilltops at high elevations in the Catskill Mountains. It formed in firm glacial till derived from reddish sandstone, siltstone, and shale. Slopes are generally convex. Areas are irregular in shape and range from 5 to 70 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 6 inches, dark reddish brown channery silt loam that has 15 percent rock fragments
Subsoil:
6 to 18 inches, yellowish red channery loam that has 20 percent rock fragments
18 to 28 inches, a fragipan of reddish brown, very firm and brittle channery loam that has 20 percent rock fragments
28 to 50 inches, a fragipan of reddish brown, very firm and brittle channery loam that has 25 percent rock fragments
Substratum:
50 to 60 inches, dark reddish brown channery loam that has 15 percent rock fragments

Inclusions.—Included with this soil in mapping are small areas of the moderately well drained Willowemoc soils on the slightly lower parts of the landscape and the somewhat poorly drained Onteora soils in seepy spots and along drainageways. Also included are the poorly drained and very poorly drained Suny soils in depressions and shallow drainageways and the shallow Halcott and moderately deep Vly soils in the more sloping areas where the deposits of glacial till are thinner. Included areas are as much as 5 acres each in size and make up about 25 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer, moderately slow or moderate in the upper part of the subsoil, and slow or very slow in the fragipan and the substratum
Available water capacity: Moderate
Soil reaction: Very strongly acid or strongly acid above the fragipan and very strongly acid to moderately acid in the fragipan and the substratum
Depth to the seasonal high water table: 2 to 4 feet (March through May)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Medium
Erosion hazard: Slight

Use.—Most areas are used for hay or pasture. Some

areas are used for cultivated crops. This soil is classified as prime farmland.

Crops and pasture.—This soil is well suited to cultivated crops. A conservation tillage system that leaves crop residue on the surface after planting will help to control erosion. Properly managing crop residue and adding other organic material will help to maintain tilth.

This soil is well suited to pasture. Rotation grazing, proper stocking rates, weed control, and applications of fertilizer will increase forage yields.

Woodland.—The potential productivity of this soil for sugar maple is moderate. Few or no limitations affect woodland management.

Dwellings.—Wetness is the main limitation, especially on sites for dwellings with basements. Grading so that surface water moves away from the dwellings and installing interceptor drains that divert water from the higher adjacent areas will reduce the wetness. Installing drains around footings and foundations and sealing the foundations also will reduce the wetness.

Local roads and streets.—Wetness and the potential for frost action are the main limitations. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action. Raised fill material and a drainage system will reduce the wetness.

Septic tank absorption fields.—Wetness and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept runoff from the higher adjacent areas. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which effluent is absorbed.

Capability classification.—IIe

LeC—Lewbeach channery silt loam, 8 to 15 percent slopes. This soil is very deep, strongly sloping, and well drained. It is on hilltops and hillsides at high elevations in the Catskill Mountains. It formed in firm glacial till derived from reddish sandstone, siltstone, and shale. Slopes are generally convex. Areas are irregular in shape and range from 5 to 100 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 6 inches, dark reddish brown channery silt loam that has 15 percent rock fragments
Subsoil:
6 to 18 inches, yellowish red channery loam that has 20 percent rock fragments
18 to 28 inches, a fragipan of reddish brown, very firm and brittle channery loam that has 20 percent rock fragments
28 to 50 inches, a fragipan of reddish brown, very firm and brittle channery loam that has 25 percent rock fragments
Substratum:
50 to 60 inches, dark reddish brown channery loam that has 15 percent rock fragments

Inclusions.—Included with this soil in mapping are small areas of the moderately well drained Willowemoc soils on the slightly lower parts of the landscape and the somewhat poorly drained Onteora soils in seepy spots and along drainageways. Also included are the poorly drained and very poorly drained Suny soils in depressions and shallow drainageways and the shallow Halcott and moderately deep Vly soils in the more sloping areas where the deposits of glacial till are thinner. Included areas are as much as 5 acres each in size and make up about 20 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer, moderately slow or moderate in the upper part of the subsoil, and slow or very slow in the fragipan and the substratum
Available water capacity: Moderate
Soil reaction: Very strongly acid or strongly acid above the fragipan and very strongly acid to moderately acid in the fragipan and the substratum
Depth to the seasonal high water table: 2 to 4 feet (March through May)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Medium
Erosion hazard: Moderate

Use.—Most areas of this soil are used for hay or pasture. Some areas are used for cultivated crops or woodland.

Crops and pasture.—This soil is moderately suited to cultivated crops. Erosion is a hazard, and seasonal wetness delays planting in some years. Contour farming or stripcropping and a conservation tillage system that leaves crop residue on the surface after planting will help to control erosion. Properly managing crop residue and adding other organic material will help to maintain tilth.

This soil is well suited to pasture. Rotation grazing, proper stocking rates, weed control, and applications of fertilizer will increase forage yields.

Woodland.—The potential productivity of this soil for

sugar maple is moderate. Few or no limitations affect woodland management.

Dwellings.—Wetness is the main limitation, especially on sites for dwellings with basements. Grading so that surface water moves away from the dwellings and installing interceptor drains that divert water from the higher adjacent areas will reduce the wetness. Installing drains around footings and foundations and sealing the foundations also will reduce the wetness. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—Wetness, the slope, and the potential for frost action are the main limitations. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action. Raised fill material and a drainage system will reduce the wetness. Special design helps to overcome the slope.

Septic tank absorption fields.—Wetness and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept runoff from the higher adjacent areas. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which effluent is absorbed.

Capability classification.—IIIe

LeD—Lewbeach channery silt loam, 15 to 25 percent slopes. This soil is very deep, moderately steep, and well drained. It is on hillsides at high elevations in the Catskill Mountains. It formed in firm glacial till derived from reddish sandstone, siltstone, and shale. Slopes are generally convex. Areas are long and narrow or irregular in shape and range from 10 to 100 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 6 inches, dark reddish brown channery silt loam that has 15 percent rock fragments

Subsoil:
- 6 to 18 inches, yellowish red channery loam that has 20 percent rock fragments
- 18 to 28 inches, a fragipan of reddish brown, very firm and brittle channery loam that has 20 percent rock fragments
- 28 to 50 inches, a fragipan of reddish brown, very firm and brittle channery loam that has 25 percent rock fragments

Substratum:
- 50 to 60 inches, dark reddish brown channery loam that has 15 percent rock fragments

Inclusions.—Included with this soil in mapping are small areas of the moderately well drained Willowemoc soils on the slightly lower parts of the landscape and the somewhat poorly drained Onteora soils in seepy spots and along drainageways. Also included are the poorly drained and very poorly drained Suny soils in depressions and shallow drainageways and the shallow Halcott and moderately deep Vly soils in the more sloping areas where the deposits of glacial till are thinner. Included areas are as much as 5 acres each in size and make up about 20 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer, moderately slow or moderate in the upper part of the subsoil, and slow or very slow in the fragipan and the substratum
Available water capacity: Moderate
Soil reaction: Very strongly acid or strongly acid above the fragipan and very strongly acid to moderately acid in the fragipan and the substratum
Depth to the seasonal high water table: 2 to 4 feet (March through May)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Rapid
Erosion hazard: Severe

Use.—Most areas of this soil are used as woodland. Some areas are used for hay or pasture.

Crops and pasture.—This soil is poorly suited to cultivated crops. Erosion is a hazard, and seasonal wetness delays planting in some years. Contour farming or stripcropping, a crop rotation dominated by close-growing crops, and a conservation tillage system that leaves crop residue on the surface after planting will help to control erosion. Properly managing crop residue and adding other organic material will help to maintain tilth.

This soil is moderately suited to pasture. Rotation grazing, proper stocking rates, weed control, and applications of fertilizer will increase forage yields.

Woodland.—The potential productivity of this soil for sugar maple is moderate. The slope limits the use of equipment.

Dwellings.—Wetness and the slope are the main limitations, especially on sites for dwellings with basements. Installing drains around footings and foundations and sealing the foundations will reduce the wetness. Special design helps to overcome the slope. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—The slope is the main

limitation. Special design and grading or filling will help to overcome this limitation.

Septic tank absorption fields.—Wetness, the slope, and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept runoff from the higher adjacent areas. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which effluent is absorbed. Installing the distribution lines on the contour and providing drop boxes or similar structures will increase the efficiency of the system.

Capability classification.—IVe

LeE—Lewbeach channery silt loam, 25 to 35 percent slopes. This soil is very deep, moderately steep, and well drained. It is on hillsides and hilltops at high elevations in the Catskill Mountains. It formed in firm glacial till derived from reddish sandstone, siltstone, and shale. Slopes are generally convex. Areas are oval or irregular in shape and range from 3 to 40 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 6 inches, dark reddish brown channery silt loam that has 15 percent rock fragments

Subsoil:

6 to 18 inches, yellowish red channery loam that has 20 percent rock fragments

18 to 28 inches, a fragipan of reddish brown, very firm and brittle channery loam that has 20 percent rock fragments

28 to 50 inches, a fragipan of reddish brown, very firm and brittle channery loam that has 25 percent rock fragments

Substratum:

50 to 60 inches, dark reddish brown channery loam that has 15 percent rock fragments

Inclusions.—Included with this soil in mapping are small areas of the moderately well drained Willowemoc soils on the slightly lower parts of the landscape and the somewhat poorly drained Onteora soils in seepy spots and along drainageways. Also included are the poorly drained and very poorly drained Suny soils in depressions and shallow drainageways, the shallow Halcott and moderately deep Vly soils in the more sloping areas where the deposits of glacial till are thinner, and areas that are eroded or that have stones and boulders on the surface. Included areas are as much as 3 acres each in size and make up about 20 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer, moderately slow or moderate in the upper part of the subsoil, and slow or very slow in the fragipan and the substratum

Available water capacity: Moderate

Soil reaction: Very strongly acid or strongly acid above the fragipan and very strongly acid to moderately acid in the fragipan and the substratum

Depth to the seasonal high water table: 2 to 4 feet (March through May)

Flooding: None

Depth to bedrock: More than 60 inches

Surface runoff: Very rapid

Erosion hazard: Very severe

Use.—Most areas of this soil are used as woodland. Some areas are used for hay or pasture.

Crops and pasture.—This soil is generally unsuited to cultivated crops and poorly suited to pasture. Erosion is a hazard, and seasonal wetness delays planting in some years. Rotation grazing, proper stocking rates, weed control, and applications of fertilizer will increase forage yields and help to control erosion.

Woodland.—The potential productivity of this soil for sugar maple is moderate. The slope limits the use of equipment.

Dwellings.—Wetness and the slope are the main limitations, especially on sites for dwellings with basements.

Local roads and streets.—The slope is the main limitation. Special design and grading or filling will help to overcome this limitation.

Septic tank absorption fields.—Wetness, the slope, and the restricted permeability are the main limitations.

Capability classification.—VIe

LfF—Lewbeach channery silt loam, 35 to 55 percent slopes, very stony. This soil is very deep, very steep, and well drained. It is on hillsides and hilltops at high elevations in the Catskill Mountains. It formed in firm glacial till derived from reddish sandstone, siltstone, and shale. Stones 10 to 24 inches in diameter cover as much as 3 percent of the surface. Slopes are generally convex. Areas are oval or irregular in shape and range from 3 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 6 inches, dark reddish brown channery silt loam that has 15 percent rock fragments

Subsoil:

6 to 18 inches, yellowish red channery loam that

has 20 percent rock fragments
18 to 28 inches, a fragipan of reddish brown, very firm and brittle channery loam that has 20 percent rock fragments
28 to 50 inches, a fragipan of reddish brown, very firm and brittle channery loam that has 25 percent rock fragments

Substratum:
50 to 60 inches, dark reddish brown channery loam that has 15 percent rock fragments

Inclusions.—Included with this soil in mapping are small areas of the moderately well drained Willowemoc soils on the slightly lower parts of the landscape and the somewhat poorly drained Onteora soils in seepy spots and along drainageways. Also included are the poorly drained and very poorly drained Suny soils in depressions and shallow drainageways, the shallow Halcott and moderately deep Vly soils in the more sloping areas where the deposits of glacial till are thinner, and areas that do not have stones and boulders on the surface. Included areas are as much as 3 acres each in size and make up about 25 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer, moderately slow or moderate in the upper part of the subsoil, and slow or very slow in the fragipan and the substratum
Available water capacity: Moderate
Soil reaction: Very strongly acid or strongly acid above the fragipan and very strongly acid to moderately acid in the fragipan and the substratum
Depth to the seasonal high water table: 2 to 4 feet (March through May)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Very rapid
Erosion hazard: Very severe

Use.—Most areas of this soil are used as woodland.

Crops and pasture.—This soil is generally unsuited to cultivated crops and pasture. The stones on the surface interfere with planting and harvesting, and the slope makes the use of farm equipment unsafe. Wetness delays planting in some years.

Woodland.—The potential productivity of this soil for sugar maple is moderate. The slope limits the use of equipment, and erosion is a hazard.

Dwellings.—Wetness and the slope are the main limitations, especially on sites for dwellings with basements.

Local roads and streets.—The slope is the main limitation. Special design and grading or filling will help to overcome this limitation.

Septic tank absorption fields.—Wetness, the slope, and the restricted permeability are the main limitations.

Capability classification.—VIIs

LgF—Lewbeach channery silt loam, very steep, very bouldery. This soil is very deep and well drained. It is on hillsides and hilltops at high elevations in the Catskill Mountains. It formed in firm glacial till derived from reddish sandstone, siltstone, and shale. Boulders that are more than 24 inches in diameter cover as much as 3 percent of the surface. Slopes are generally convex. They range from 45 to 65 percent. Areas are oval or irregular in shape and range from 3 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 6 inches, dark reddish brown channery silt loam that has 15 percent rock fragments

Subsoil:
6 to 18 inches, yellowish red channery loam that has 20 percent rock fragments
18 to 28 inches, a fragipan of reddish brown, very firm and brittle channery loam that has 20 percent rock fragments
28 to 50 inches, a fragipan of reddish brown, very firm and brittle channery loam that has 25 percent rock fragments

Substratum:
50 to 60 inches, dark reddish brown channery loam that has 15 percent rock fragments

Inclusions.—Included with this soil in mapping are small areas of the moderately well drained Willowemoc soils on the slightly lower parts of the landscape and the somewhat poorly drained Onteora soils in seepy spots and along drainageways. Also included are the poorly drained and very poorly drained Suny soils in depressions and shallow drainageways, the shallow Halcott and moderately deep Vly soils in the more sloping areas where the deposits of glacial till are thinner, and areas that do not have stones and boulders on the surface. Included areas are as much as 3 acres each in size and make up about 25 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer, moderately slow or moderate in the upper part of the subsoil, and slow or very slow in the fragipan and the substratum
Available water capacity: Moderate
Soil reaction: Very strongly acid or strongly acid above the fragipan and very strongly acid to moderately acid in the fragipan and the substratum

Depth to the seasonal high water table: 2 to 4 feet (March through May)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Very rapid
Erosion hazard: Very severe

Use.—Most areas of this soil are used as woodland.

Crops and pasture.—This soil is generally unsuited to cultivated crops and pasture. The boulders on the surface interfere with planting and harvesting, and the slope makes the use of farm equipment unsafe. Wetness delays planting in some years.

Woodland.—The potential productivity of this soil for sugar maple is moderate. The slope limits the use of equipment, and erosion is a hazard.

Dwellings.—Wetness and the slope are the main limitations, especially on sites for dwellings with basements.

Local roads and streets.—The slope is the main limitation. Special design and grading or filling will help to overcome this limitation.

Septic tank absorption fields.—Wetness, the slope, and the restricted permeability are the main limitations.

Capability classification.—VIIs

LIC—Lewbeach and Willowemoc channery silt loams, 3 to 15 percent slopes, very stony. This unit consists of very deep, gently sloping to strongly sloping soils on hillsides at high elevations in the Catskill Mountains. The soils formed in firm glacial till derived from reddish sandstone, siltstone, and shale. Stones 10 to 24 inches in diameter cover as much as 3 percent of the surface. Slopes are generally convex, but some are short and irregular. Areas are irregular in shape and range from 3 to 250 acres in size. The total acreage of the unit is about 55 percent Lewbeach soil, 20 percent Willowemoc soil, and 25 percent other soils. Some areas consist mainly of well drained Lewbeach soil, some mainly of moderately well drained Willowemoc soil, and some of both. The soils were mapped together because they are used and managed in similar ways.

The typical sequence, depth, and composition of the layers of the Lewbeach soil are as follows—

Surface layer:
0 to 6 inches, dark reddish brown channery silt loam that has 15 percent rock fragments
Subsoil:
6 to 18 inches, yellowish red channery loam that has 20 percent rock fragments
18 to 28 inches, reddish brown, very firm and brittle channery loam that has 20 percent rock fragments
28 to 50 inches, reddish brown, very firm and brittle channery loam that has 25 percent rock fragments
Substratum:
50 to 60 inches, dark reddish brown channery loam that has 15 percent rock fragments

Typically, the surface of the Willowemoc soil is covered by about 1 inch of leaf litter. The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 6 inches, dark reddish brown channery silt loam that has 25 percent rock fragments
Subsoil:
6 to 14 inches, reddish brown channery loam that has 20 percent rock fragments
14 to 18 inches, reddish brown channery loam that has brown and strong brown mottles
18 to 21 inches, reddish brown channery loam that has strong brown mottles
21 to 60 inches, a fragipan of reddish brown, very firm and brittle channery loam

Inclusions.—Included in this unit in mapping are small areas of the somewhat poorly drained Onteora soils in seepy spots and along drainageways. Also included are the poorly drained and very poorly drained Suny soils in depressions and shallow drainageways, the shallow Halcott and moderately deep Vly soils in the more sloping areas, areas that do not have stones and boulders on the surface, and eroded areas. Included areas are as much as 3 acres each in size.

Major properties of the Lewbeach soil—

Permeability: Moderate in the surface layer, moderately slow or moderate in the upper part of the subsoil, and slow or very slow in the fragipan and the substratum
Available water capacity: Moderate
Soil reaction: Very strongly acid or strongly acid above the fragipan and very strongly acid to moderately acid in the fragipan and the substratum
Depth to the seasonal high water table: 2 to 4 feet (March through May)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Medium
Erosion hazard: Moderate

Major properties of the Willowemoc soil—

Permeability: Moderate in the surface layer and the upper part of the subsoil and slow or very slow in the fragipan
Available water capacity: Moderate

Soil reaction: Extremely acid to strongly acid in the surface layer and subsoil and strongly acid or moderately acid in the substratum
Depth to the seasonal high water table: 1.5 to 2.5 feet (October through May)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Medium
Erosion hazard: Moderate

Use.—Most areas of this unit are used as woodland. Some areas are used as pasture.

Crops and pasture.—This unit is generally unsuited to cultivated crops and pasture. The stones on the surface are the main limitation. They interfere with the use of farm equipment. Wetness delays planting in some years.

Woodland.—The potential productivity of this unit for sugar maple is moderate. Few or no limitations affect woodland management.

Dwellings.—Wetness is the main limitation, especially on sites for dwellings with basements. It can be reduced by installing subsurface drains around the foundations and backfilling with sand and gravel. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—Wetness, the slope, and the potential for frost action are the main limitations. Raised fill of coarse grained material will reduce the wetness and the potential for frost action. Land shaping and grading or special design will help to overcome the slope.

Septic tank absorption fields.—Wetness and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept runoff from the higher adjacent areas. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which effluent is absorbed.

Capability classification.—VIIs

LID—Lewbeach and Willowemoc channery silt loams, 15 to 35 percent slopes, very stony. This unit consists of very deep, moderately steep soils on hilltops and hillsides at high elevations in the Catskill Mountains. The soils formed in firm glacial till derived from reddish sandstone, siltstone, and shale. Stones 10 to 24 inches in diameter cover as much as 3 percent of the surface. Slopes are generally convex, but some are short and irregular. Areas are irregular in shape and range from 3 to 250 acres in size. The total acreage of the unit is about 55 percent Lewbeach soil, 20 percent Willowemoc soil, and 25 percent other soils. Some areas consist mainly of well drained Lewbeach soil, some mainly of moderately well drained Willowemoc soil, and some of both. The soils were mapped together because they are used and managed in similar ways.

The typical sequence, depth, and composition of the layers of the Lewbeach soil are as follows—

Surface layer:
0 to 6 inches, dark reddish brown channery silt loam that has 15 percent rock fragments
Subsoil:
6 to 18 inches, yellowish red channery loam that has 20 percent rock fragments
18 to 28 inches, reddish brown, very firm and brittle channery loam that has 20 percent rock fragments
28 to 50 inches, reddish brown, very firm and brittle channery loam that has 25 percent rock fragments
Substratum:
50 to 60 inches, dark reddish brown channery loam that has 15 percent rock fragments

Typically, the surface of the Willowemoc soil is covered by about 1 inch of leaf litter. The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 6 inches, dark reddish brown channery silt loam that has 25 percent rock fragments
Subsoil:
6 to 14 inches, reddish brown channery loam that has 20 percent rock fragments
14 to 18 inches, reddish brown channery loam that has brown and strong brown mottles
18 to 21 inches, reddish brown channery loam that has strong brown mottles
21 to 60 inches, a fragipan of reddish brown, very firm and brittle channery loam

Inclusions.—Included in this unit in mapping are small areas of the somewhat poorly drained Onteora soils in seepy spots and along drainageways. Also included are the poorly drained and very poorly drained Suny soils in depressions and shallow drainageways, the shallow Halcott and moderately deep Vly soils in the more sloping areas, areas that do not have stones and boulders on the surface, and eroded areas. Included areas are as much as 3 acres each in size.

Major properties of the Lewbeach soil—

Permeability: Moderate in the surface layer, moderately slow or moderate in the upper part of the subsoil,

and slow or very slow in the fragipan and the substratum
Available water capacity: Moderate
Soil reaction: Very strongly acid or strongly acid above the fragipan and very strongly acid to moderately acid in the fragipan and the substratum
Depth to the seasonal high water table: 2 to 4 feet (March through May)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Rapid
Erosion hazard: Severe

Major properties of the Willowemoc soil—

Permeability: Moderate in the surface layer and the upper part of the subsoil and slow or very slow in the fragipan
Available water capacity: Moderate
Soil reaction: Extremely acid to strongly acid in the surface layer and subsoil and strongly acid or moderately acid in the substratum
Depth to the seasonal high water table: 1.5 to 2.5 feet (October through May)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Rapid
Erosion hazard: Severe

Use.—Most areas of this unit are used as woodland. Some areas are used as pasture.

Crops and pasture.—This unit is generally unsuited to cultivated crops and pasture. The stones on the surface, the slope, and the erosion hazard are the main management concerns. The stones interfere with the use of farm equipment. Wetness delays planting in some years.

Woodland.—The potential productivity of this unit for sugar maple is moderate. The slope limits the use of equipment.

Dwellings.—Wetness and the slope are the main limitations, especially on sites for dwellings with basements. The wetness can be reduced by installing subsurface drains around the foundations and backfilling with sand and gravel. Special design will help to overcome the slope. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—The slope is the main limitation. Land shaping and grading or special design will help to overcome this limitation.

Septic tank absorption fields.—Wetness, the slope, and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept runoff from the higher adjacent areas. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which effluent is absorbed. Installing the distribution lines on the contour and providing drop boxes or similar structures will increase the efficiency of the system.

Capability classification.—VIIs

LmC—Lewbeach and Willowemoc channery silt loams, strongly sloping, very bouldery. This unit consists of very deep soils on hilltops and hillsides at high elevations in the Catskill Mountains. The soils formed in firm glacial till derived from reddish sandstone, siltstone, and shale. Boulders more than 24 inches in diameter cover as much as 3 percent of the surface. Slopes are generally convex, but some are short and irregular. They range from 3 to 15 percent. Areas are irregular in shape and range from 3 to 300 acres in size. The total acreage of the unit is about 55 percent Lewbeach soil, 20 percent Willowemoc soil, and 25 percent other soils. Some areas consist mainly of well drained Lewbeach soil, some mainly of moderately well drained Willowemoc soil, and some of both. The soils were mapped together because they are used and managed in similar ways.

The typical sequence, depth, and composition of the layers of the Lewbeach soil are as follows—

Surface layer:
0 to 6 inches, dark reddish brown channery silt loam that has 15 percent rock fragments
Subsoil:
6 to 18 inches, yellowish red channery loam that has 20 percent rock fragments
18 to 28 inches, reddish brown, very firm and brittle channery loam that has 20 percent rock fragments
28 to 50 inches, reddish brown, very firm and brittle channery loam that has 25 percent rock fragments
Substratum:
50 to 60 inches, dark reddish brown channery loam that has 15 percent rock fragments

Typically, the surface of the Willowemoc soil is covered by about 1 inch of leaf litter. The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 6 inches, dark reddish brown channery silt loam that has 25 percent rock fragments
Subsoil:
6 to 14 inches, reddish brown channery loam that has 20 percent rock fragments

14 to 18 inches, reddish brown channery loam that has brown and strong brown mottles
18 to 21 inches, reddish brown channery loam that has strong brown mottles
21 to 60 inches, a fragipan of reddish brown, very firm and brittle channery loam

Inclusions.—Included in this unit in mapping are small areas of the somewhat poorly drained Onteora soils in seepy spots and along drainageways. Also included are the poorly drained and very poorly drained Suny soils in depressions and shallow drainageways, the shallow Halcott and moderately deep Vly soils in the more sloping areas, areas that do not have stones and boulders on the surface, and eroded areas. Included areas are as much as 3 acres each in size and make up about 25 percent of the unit.

Major properties of the Lewbeach soil—

Permeability: Moderate in the surface layer, moderately slow or moderate in the upper part of the subsoil, and slow or very slow in the fragipan and the substratum
Available water capacity: Moderate
Soil reaction: Very strongly acid or strongly acid above the fragipan and very strongly acid to moderately acid in the fragipan and the substratum
Depth to the seasonal high water table: 2 to 4 feet (March through May)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Medium
Erosion hazard: Moderate

Major properties of the Willowemoc soil—

Permeability: Moderate in the surface layer and the upper part of the subsoil and slow or very slow in the fragipan
Available water capacity: Moderate
Soil reaction: Extremely acid to strongly acid in the surface layer and subsoil and strongly acid or moderately acid in the substratum
Depth to the seasonal high water table: 1.5 to 2.5 feet (October through May)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Medium
Erosion hazard: Moderate

Use.—Most areas of this unit are used as woodland. Some areas are used as pasture.

Crops and pasture.—This unit is generally unsuited to cultivated crops and pasture. The boulders on the surface are the main limitation. They interfere with the use of farm equipment. Wetness delays planting in some years.

Woodland.—The potential productivity of the Lewbeach soil for sugar maple is moderate. Few or no limitations affect woodland management.

Dwellings.—Wetness is the main limitation, especially on sites for dwellings with basements. It can be reduced by installing subsurface drains around the foundations and backfilling with sand and gravel. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—Wetness, the slope, and the potential for frost action are the main limitations. Raised fill of coarse grained material will reduce the wetness and the potential for frost action. Land shaping and grading or special design will help to overcome the slope.

Septic tank absorption fields.—Wetness and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept runoff from the higher adjacent areas. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which effluent is absorbed.

Capability classification.—VIIs

LmD—Lewbeach and Willowemoc channery silt loams, moderately steep, very bouldery. This unit consists of very deep soils on hilltops and hillsides at high elevations in the Catskill Mountains. The soils formed in firm glacial till derived from reddish sandstone, siltstone, and shale. Boulders more than 24 inches in diameter cover as much as 3 percent of the surface. Slopes are generally convex, but some are short and irregular. They range from 15 to 35 percent. Areas are irregular in shape and range from 10 to 400 acres in size. The total acreage of the unit is about 50 percent Lewbeach soil, 25 percent Willowemoc soil, and 25 percent other soils. Some areas consist mainly of well drained Lewbeach soil, some mainly of moderately well drained Willowemoc soil, and some of both. The soils were mapped together because they are used and managed in similar ways.

The typical sequence, depth, and composition of the layers of the Lewbeach soil are as follows—

Surface layer:
0 to 6 inches, dark reddish brown channery silt

loam that has 15 percent rock fragments

Subsoil:

6 to 18 inches, yellowish red channery loam that has 20 percent rock fragments

18 to 28 inches, reddish brown, very firm and brittle channery loam that has 20 percent rock fragments

28 to 50 inches, reddish brown, very firm and brittle channery loam that has 25 percent rock fragments

Substratum:

50 to 60 inches, dark reddish brown channery loam that has 15 percent rock fragments

Typically, the surface of the Willowemoc soil is covered by about 1 inch of leaf litter. The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 6 inches, dark reddish brown channery silt loam that has 25 percent rock fragments

Subsoil:

6 to 14 inches, reddish brown channery loam that has 20 percent rock fragments

14 to 18 inches, reddish brown channery loam that has brown and strong brown mottles

18 to 21 inches, reddish brown channery loam that has strong brown mottles

21 to 60 inches, a fragipan of reddish brown, very firm and brittle channery loam

Inclusions.—Included in this unit in mapping are small areas of the somewhat poorly drained Onteora soils in seepy spots and along drainageways. Also included are the poorly drained and very poorly drained Suny soils in depressions and shallow drainageways, the shallow Halcott and moderately deep Vly soils in the more sloping areas, areas that do not have stones and boulders on the surface, and eroded areas. Included areas are as much as 3 acres each in size.

Major properties of the Lewbeach soil—

Permeability: Moderate in the surface layer, moderately slow or moderate in the upper part of the subsoil, and slow or very slow in the fragipan and the substratum

Available water capacity: Moderate

Soil reaction: Very strongly acid or strongly acid above the fragipan and very strongly acid to moderately acid in the fragipan and the substratum

Depth to the seasonal high water table: 2 to 4 feet (March through May)

Flooding: None

Depth to bedrock: More than 60 inches

Surface runoff: Rapid

Erosion hazard: Severe

Major properties of the Willowemoc soil—

Permeability: Moderate in the surface layer and the upper part of the subsoil and slow or very slow in the fragipan

Available water capacity: Moderate

Soil reaction: Extremely acid to strongly acid in the surface layer and subsoil and strongly acid or moderately acid in the substratum

Depth to the seasonal high water table: 1.5 to 2.5 feet (October through May)

Flooding: None

Depth to bedrock: More than 60 inches

Surface runoff: Rapid

Erosion hazard: Severe

Use.—Most areas of this unit are used as woodland. Some areas are used as pasture.

Crops and pasture.—This unit is generally unsuited to cultivated crops and pasture. The stones on the surface, the slope, and the erosion hazard are the main management concerns. The stones interfere with the use of farm equipment. Wetness delays planting in some years.

Woodland.—The potential productivity of the Lewbeach soil for sugar maple is moderate. The slope limits the use of equipment.

Dwellings.—Wetness and the slope are the main limitations, especially on sites for dwellings with basements. The wetness can be reduced by installing subsurface drains around the foundations and backfilling with sand and gravel. Special design will help to overcome the slope. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—The slope is the main limitation. Land shaping and grading or special design will help to overcome this limitation.

Septic tank absorption fields.—Wetness, the slope, and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept runoff from the higher adjacent areas. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which effluent is absorbed. Installing the distribution lines on the contour and providing drop boxes or similar structures will increase the efficiency of the system.

Capability classification.—VIIs

LoA—Lordstown channery silt loam, 0 to 3 percent slopes. This soil is moderately deep, nearly level, and well drained. It is on the smooth parts of bedrock-controlled uplands. It formed in glacial till derived from sandstone, siltstone, and shale. Slopes are generally convex. Areas are broad and irregular in shape and range from 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 5 inches, dark brown channery silt loam that has 30 percent rock fragments
Subsoil:
5 to 11 inches, dark yellowish brown channery silt loam that has 25 percent rock fragments
11 to 21 inches, yellowish brown channery silt loam that has 30 percent rock fragments
21 to 26 inches, light olive brown channery silt loam that has 30 percent rock fragments
Bedrock:
26 inches, gray, fractured sandstone

Inclusions.—Included with this soil in mapping are small areas of the shallow Arnot and Tuller soils. Arnot soils are in the slightly higher areas, and Tuller soils are in seepy areas and shallow drainageways. Also included are areas of the very deep Valois soils and small eroded areas. Included areas are as much as 3 acres each in size and make up about 25 percent of the unit.

Major soil properties—

Permeability: Moderate throughout the profile
Available water capacity: Moderate
Soil reaction: Very strongly acid to slightly acid in the surface layer and very strongly acid to moderately acid in the subsoil
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 20 to 40 inches
Surface runoff: Slow
Erosion hazard: None or slight

Use.—Most areas are used for cultivated crops. Some areas are used for hay or pasture. This soil is classified as prime farmland.

Crops and pasture.—This soil is well suited to cultivated crops. A conservation tillage system that leaves crop residue on the surface after planting will help to control erosion. Properly managing crop residue and adding other organic material will help to maintain tilth.

This soil is well suited to pasture. Rotation grazing, proper stocking rates, weed control, and applications of fertilizer will increase forage yields.

Woodland.—The potential productivity of this soil for northern red oak is moderate. Few or no limitations affect woodland management.

Dwellings.—The depth to bedrock is the main limitation on sites for dwellings, especially those with basements. Building above the bedrock and adding fill as needed will help to overcome this limitation.

Local roads and streets.—The depth to bedrock and the potential for frost action are the main limitations. Planning road locations and grades so that rock removal is not needed will help to overcome the depth to bedrock. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action.

Septic tank absorption fields.—The depth to bedrock is the main limitation. A poor filtering capacity is a limitation, and contamination of the ground water is a hazard.

Capability classification.—IIs

LoB—Lordstown channery silt loam, 3 to 8 percent slopes. This soil is moderately deep, gently sloping, and well drained. It is on ridgetops on bedrock-controlled uplands. It formed in glacial till derived from sandstone, siltstone, and shale. Slopes are generally convex. Areas are broad and irregular in shape and range from 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 5 inches, dark brown channery silt loam that has 30 percent rock fragments
Subsoil:
5 to 11 inches, dark yellowish brown channery silt loam that has 25 percent rock fragments
11 to 21 inches, yellowish brown channery silt loam that has 30 percent rock fragments
21 to 26 inches, light olive brown channery silt loam that has 30 percent rock fragments
Bedrock:
26 inches, gray, fractured sandstone

Inclusions.—Included with this soil in mapping are small areas of the shallow Arnot and Tuller soils. Arnot soils are in the slightly higher areas, and Tuller soils are in seepy areas and shallow drainageways. Also included are areas of the very deep Valois soils and small eroded areas. Included areas are as much as 3 acres each in size and make up about 20 percent of the unit.

Major soil properties—

Permeability: Moderate throughout the profile
Available water capacity: Moderate

Soil reaction: Very strongly acid to slightly acid in the surface layer and very strongly acid to moderately acid in the subsoil
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 20 to 40 inches
Surface runoff: Medium
Erosion hazard: Slight

Use.—Most areas are used for cultivated crops. Some areas are used for hay or pasture. This soil is classified as prime farmland.

Crops and pasture.—This soil is well suited to cultivated crops. A conservation tillage system that leaves crop residue on the surface after planting will help to control erosion. Properly managing crop residue and adding other organic material will help to maintain tilth.

This soil is well suited to pasture. Rotation grazing, proper stocking rates, weed control, and applications of fertilizer will increase forage yields.

Woodland.—The potential productivity of this soil for northern red oak is moderate. Few or no limitations affect woodland management.

Dwellings.—The depth to bedrock is the main limitation on sites for dwellings, especially those with basements. Building above the bedrock and adding fill as needed will help to overcome this limitation.

Local roads and streets.—The depth to bedrock and the potential for frost action are the main limitations. Planning road locations and grades so that rock removal is not needed will help to overcome the depth to bedrock. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action.

Septic tank absorption fields.—The depth to bedrock is the main limitation. A poor filtering capacity is a limitation, and contamination of the ground water is a hazard.

Capability classification.—IIe

LoC—Lordstown channery silt loam, 8 to 15 percent slopes. This soil is moderately deep, strongly sloping, and well drained. It is on the sides of ridges on bedrock-controlled uplands. It formed in glacial till derived from sandstone, siltstone, and shale. Slopes are generally convex. Areas are broad and irregular in shape and range from 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 5 inches, dark brown channery silt loam that has 30 percent rock fragments
Subsoil:
5 to 11 inches, dark yellowish brown channery silt loam that has 25 percent rock fragments
11 to 21 inches, yellowish brown channery silt loam that has 30 percent rock fragments
21 to 26 inches, light olive brown channery silt loam that has 30 percent rock fragments
Bedrock:
26 inches, gray, fractured sandstone

Inclusions.—Included with this soil in mapping are small areas of the shallow Arnot and Tuller soils. Arnot soils are in the slightly higher areas, and Tuller soils are in seepy areas and shallow drainageways. Also included are areas of the very deep Valois soils and small eroded areas. Included areas are as much as 3 acres each in size and make up about 20 percent of the unit.

Major soil properties—

Permeability: Moderate throughout the profile
Available water capacity: Moderate
Soil reaction: Very strongly acid to slightly acid in the surface layer and very strongly acid to moderately acid in the subsoil
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 20 to 40 inches
Surface runoff: Medium
Erosion hazard: Moderate

Use.—Most areas of this soil are used for hay or pasture. Some areas are used for cultivated crops, and some are used as woodland.

Crops and pasture.—This soil is moderately suited to cultivated crops. Contour farming or stripcropping and a conservation tillage system that leaves crop residue on the surface after planting will help to control erosion. Properly managing crop residue and adding other organic material will help to maintain tilth.

This soil is well suited to pasture. Rotation grazing, proper stocking rates, weed control, and applications of fertilizer will increase forage yields.

Woodland.—The potential productivity of this soil for northern red oak is moderate. Few or no limitations affect woodland management.

Dwellings.—The depth to bedrock is the main limitation on sites for dwellings, especially those with basements. Building above the bedrock and adding fill as needed will help to overcome this limitation. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—The depth to bedrock and the potential for frost action are the main limitations. Planning road locations and grades so that rock removal is not needed will help to overcome the depth

to bedrock. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action.

Septic tank absorption fields.—The depth to bedrock is the main limitation. A poor filtering capacity is a limitation, and contamination of the ground water is a hazard.

Capability classification.—IIIe

LoD—Lordstown channery silt loam, 15 to 25 percent slopes. This soil is moderately deep, moderately steep, and well drained. It is on the sides and top of ridges on bedrock-controlled uplands. It formed in glacial till derived from sandstone, siltstone, and shale. Slopes are generally convex. Areas are broad and irregular in shape and range from 5 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 5 inches, dark brown channery silt loam that has 30 percent rock fragments

Subsoil:
- 5 to 11 inches, dark yellowish brown channery silt loam that has 25 percent rock fragments
- 11 to 21 inches, yellowish brown channery silt loam that has 30 percent rock fragments
- 21 to 26 inches, light olive brown channery silt loam that has 30 percent rock fragments

Bedrock:
- 26 inches, gray, fractured sandstone

Inclusions.—Included with this soil in mapping are small areas of the shallow Arnot and Tuller soils. Arnot soils are in the slightly higher areas, and Tuller soils are in seepy areas and shallow drainageways. Also included are areas of the very deep Valois soils and small eroded areas. Included areas are as much as 3 acres each in size and make up about 20 percent of the unit.

Major soil properties—

Permeability: Moderate throughout the profile
Available water capacity: Moderate
Soil reaction: Very strongly acid to slightly acid in the surface layer and very strongly acid to moderately acid in the subsoil
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 20 to 40 inches
Surface runoff: Rapid
Erosion hazard: Severe

Use.—Most areas of this soil are used as woodland. Some areas are used for hay or pasture.

Crops and pasture.—This soil is poorly suited to cultivated crops. Erosion is the main hazard. Contour farming or stripcropping, a crop rotation dominated by close-growing crops, and a conservation tillage system that leaves crop residue on the surface after planting will help to control erosion. Properly managing crop residue and adding other organic material will help to maintain tilth.

This soil is moderately suited to pasture. Erosion is the main hazard. Rotation grazing, proper stocking rates, weed control, and applications of fertilizer will increase forage yields.

Woodland.—The potential productivity of this soil for northern red oak is moderate. The slope limits the use of equipment.

Dwellings.—The depth to bedrock and the slope are the main limitations on sites for dwellings, especially those with basements. Building above the bedrock and adding fill as needed will help to overcome the depth to bedrock. Special design helps to overcome the slope. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—The slope is the main limitation. Special design will help to overcome this limitation.

Septic tank absorption fields.—The depth to bedrock and the slope are the main limitations. A poor filtering capacity is a limitation, and contamination of the ground water is a hazard.

Capability classification.—IVe

Lv—Lyons silt loam. This soil is very deep, nearly level, and poorly drained and very poorly drained. It is on the lowest parts of till plains. It formed in glacial till derived from sandstone, siltstone, and shale. Slopes range from 0 to 3 percent. Areas are long and narrow or irregular in shape and range from 3 to 100 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 9 inches, very dark grayish brown silt loam

Subsoil:
- 9 to 24 inches, olive gray silt loam that has yellowish brown mottles

Substratum:
- 24 to 43 inches, gray silt loam
- 43 to 61 inches, brown silt loam that has yellowish brown mottles

Inclusions.—Included with this soil in mapping are small areas of the poorly drained and very poorly drained Alden and Canandaigua soils. These soils are

in landscape positions similar to those of the Lyons soil. Also included are the somewhat poorly drained Burdett soils in the slightly higher areas and the shallow Tuller and moderately well drained Nunda soils on small ridges. Included areas are as much as 5 acres each in size and make up 15 to 20 percent of the unit.

Major soil properties—

Permeability: Moderate or moderately slow in the surface layer and subsoil and slow or very slow in the substratum
Available water capacity: High
Soil reaction: Moderately acid to neutral in the surface layer, slightly acid to mildly alkaline in the subsoil, and mildly alkaline or moderately alkaline in the substratum
Seasonal high water table: 1 foot above to 6 inches below the surface (November through June)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Very slow or ponded
Erosion hazard: None

Use.—Most areas of this soil are used as woodland. Some areas are used for pasture or cultivated crops.

Crops and pasture.—This soil is generally unsuited to cultivated crops and poorly suited to pasture. Seasonal wetness is the major limitation. A drainage system is needed for optimum yields. Deferment of grazing during wet periods, proper stocking rates, and weed control will increase forage yields.

Woodland.—The potential productivity of this soil for red maple is moderate. Seasonal wetness causes seedling mortality and windthrow. It also makes the surface soft and unable to support heavy equipment.

Dwellings.—Seasonal wetness is the main limitation.

Local roads and streets.—Wetness and the potential for frost action are the main limitations. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action. Raised fill material and a drainage system will reduce the wetness.

Septic tank absorption fields.—Wetness and the restricted permeability are the main limitations.

Capability classification.—Vw

Ly—Lyons silt loam, very stony. This soil is very deep, nearly level, and poorly drained and very poorly drained. It is on the lowest parts of till plains. It formed in glacial till derived from sandstone, siltstone, and shale. Stones as much as 24 inches in diameter cover as much as 3 percent of the surface. Slopes range from 0 to 3 percent. Areas are long and narrow or irregular in shape and range from 5 to 70 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 9 inches, very dark grayish brown silt loam
Subsoil:
9 to 24 inches, olive gray silt loam that has yellowish brown mottles
Substratum:
24 to 43 inches, gray silt loam
43 to 61 inches, brown silt loam that has yellowish brown mottles

Inclusions.—Included with this soil in mapping are small areas of the poorly drained and very poorly drained Alden and Canandaigua soils. These soils are in landscape positions similar to those of the Lyons soil. Also included are the somewhat poorly drained Burdett soils in the slightly higher areas and the shallow Tuller and moderately well drained Nunda soils on small ridges. Included areas are as much as 5 acres each in size and make up 15 to 20 percent of the unit.

Major soil properties—

Permeability: Moderate or moderately slow in the surface layer and subsoil and slow or very slow in the substratum
Available water capacity: High
Soil reaction: Moderately acid to neutral in the surface layer, slightly acid to mildly alkaline in the subsoil, and mildly alkaline or moderately alkaline in the substratum
Seasonal high water table: 1 foot above to 6 inches below the surface (November through June)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Very slow or ponded
Erosion hazard: None

Use.—Most areas of this soil are used as woodland. Some areas are used as pasture.

Crops and pasture.—This soil is generally unsuited to cultivated crops and pasture. Seasonal wetness and the stones on the surface are the major limitations.

Woodland.—The potential productivity of this soil for red maple is moderate. Seasonal wetness and the stones on the surface cause seedling mortality and windthrow and limit the use of equipment.

Dwellings.—Seasonal wetness is the main limitation.

Local roads and streets.—Wetness and the potential for frost action are the main limitations. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action. Raised fill material and a drainage system will reduce the wetness.

Septic tank absorption fields.—Wetness and the restricted permeability are the main limitations.

Capability classification.—VIIs

MaB—Maplecrest gravelly silt loam, 3 to 8 percent slopes. This soil is very deep, gently sloping, and well drained. It is on the top of moraines and the lower parts of valley sides in the Catskill Mountains. It formed in glacial till derived from reddish sandstone, siltstone, and shale. Slopes are generally convex. Areas are broad and irregular in shape and range from 5 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 8 inches, dark reddish brown gravelly silt loam that has 15 percent rock fragments

Subsoil:

8 to 18 inches, reddish brown gravelly loam that has 20 percent rock fragments

18 to 30 inches, reddish brown gravelly loam that has 25 percent rock fragments

30 to 50 inches, reddish brown gravelly loam that has 30 percent rock fragments

Substratum:

50 to 65 inches, reddish brown very gravelly sandy loam that has 50 percent rock fragments

Inclusions.—Included with this soil in mapping are the moderately deep Oquaga soils in small areas where bedrock is closer to the surface. Also included are areas of Lackawanna and Wellsboro soils and the gravelly Tunkhannock soils. Included areas are as much as 3 acres each in size and make up about 20 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and subsoil and moderate or moderately rapid in the substratum

Available water capacity: Moderate

Soil reaction: Strongly acid to slightly acid in the surface layer and subsoil and strongly acid or moderately acid in the substratum

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Depth to bedrock: More than 60 inches

Surface runoff: Slow

Erosion hazard: Slight

Use.—Most areas are used for cultivated crops, hay, or pasture. Some are used as building sites. This soil is classified as prime farmland.

Crops and pasture.—This soil is well suited to cultivated crops. A conservation tillage system that leaves crop residue on the surface after planting will help to control erosion. Properly managing crop residue and adding other organic material will help to maintain tilth.

This soil is well suited to pasture. Rotation grazing, proper stocking rates, weed control, and applications of fertilizer will increase forage yields.

Woodland.—The potential productivity of this soil for red maple is moderate. Few or no limitations affect woodland management.

Dwellings.—This soil is generally suitable as a site for dwellings.

Local roads and streets.—The potential for frost action is the main limitation. A coarse grained subgrade to frost depth will reduce the potential for frost action.

Septic tank absorption fields.—The restricted permeability is the main limitation. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which effluent is absorbed.

Capability classification.—IIe

MaC—Maplecrest gravelly silt loam, rolling. This soil is very deep and well drained. It is on the top of moraines and the lower parts of valley sides in the Catskill Mountains. It formed in glacial till derived from reddish sandstone, siltstone, and shale. Slopes are generally convex and range from 8 to 15 percent. Areas are broad and irregular in shape and range from 5 to 60 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 8 inches, dark reddish brown gravelly silt loam that has 15 percent rock fragments

Subsoil:

8 to 18 inches, reddish brown gravelly loam that has 20 percent rock fragments

18 to 30 inches, reddish brown gravelly loam that has 25 percent rock fragments

30 to 50 inches, reddish brown gravelly loam that has 30 percent rock fragments

Substratum:

50 to 65 inches, reddish brown very gravelly sandy loam that has 50 percent rock fragments

Inclusions.—Included with this soil in mapping are the moderately deep Oquaga soils in small areas where bedrock is closer to the surface. Also included are areas of Lackawanna and Wellsboro soils and the gravelly Tunkhannock soils. Included areas are as much as 3 acres each in size and make up about 15 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and subsoil and moderate or moderately rapid in the substratum
Available water capacity: Moderate
Soil reaction: Strongly acid to slightly acid in the surface layer and subsoil and strongly acid or moderately acid in the substratum
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Medium
Erosion hazard: Moderate

Use.—Most areas of this soil are used for cultivated crops. Some areas are used for hay or pasture, and a few are used as building sites.

Crops and pasture.—This soil is moderately suited to cultivated crops. Erosion is the main hazard. Contour farming or stripcropping and a conservation tillage system that leaves crop residue on the surface after planting will help to control erosion. Properly managing crop residue and adding other organic material will help to maintain tilth.

This soil is well suited to pasture. Rotation grazing, proper stocking rates, weed control, and applications of fertilizer will increase forage yields.

Woodland.—The potential productivity of this soil for red maple is moderate. Few or no limitations affect woodland management.

Dwellings.—The slope is the main limitation, especially on sites for dwellings with basements. Special design helps to overcome this limitation. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—The slope and the potential for frost action are the main limitations. Special design will help to overcome the slope. A coarse grained subgrade to frost depth will reduce the potential for frost action.

Septic tank absorption fields.—The restricted permeability and the slope are the main limitations. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which effluent is absorbed. Installing the distribution lines on the contour and providing distribution boxes or similar structures will increase the efficiency of the system.

Capability classification.—IIIe

MaD—Maplecrest gravelly silt loam, 15 to 25 percent slopes. This soil is very deep, moderately steep, and well drained. It is on the sides of moraines and the lower parts of valley sides in the Catskill Mountains. It formed in glacial till derived from reddish sandstone, siltstone, and shale. Slopes are generally convex. Areas are broad and irregular in shape and range from 5 to 60 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, dark reddish brown gravelly silt loam that has 15 percent rock fragments
Subsoil:
8 to 18 inches, reddish brown gravelly loam that has 20 percent rock fragments
18 to 30 inches, reddish brown gravelly loam that has 25 percent rock fragments
30 to 50 inches, reddish brown gravelly loam that has 30 percent rock fragments
Substratum:
50 to 65 inches, reddish brown very gravelly sandy loam that has 50 percent rock fragments

Inclusions.—Included with this soil in mapping are the moderately deep Oquaga soils in small areas where bedrock is closer to the surface. Also included are Lackawanna and Wellsboro soils, the gravelly Tunkhannock soils, and eroded areas. Included areas are as much as 3 acres each in size and make up about 20 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and subsoil and moderate or moderately rapid in the substratum
Available water capacity: Moderate
Soil reaction: Strongly acid to slightly acid in the surface layer and subsoil and strongly acid or moderately acid in the substratum
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Rapid
Erosion hazard: Severe

Use.—Most areas of this soil are used as woodland or support brush. Some areas are used as pasture.

Crops and pasture.—This soil is poorly suited to cultivated crops and moderately suited to pasture. Erosion is the main hazard. Contour farming or stripcropping, a crop rotation dominated by close-growing crops, and a conservation tillage system that leaves crop residue on the surface after planting will help to control erosion. Properly managing crop residue and adding other organic material will help to maintain tilth. Deferment of grazing during dry periods will reduce the hazard of erosion. Rotation grazing, proper stocking rates, weed control, and applications of fertilizer will increase forage yields.

Woodland.—The potential productivity of this soil for red maple is moderate. The slope limits the use of equipment.

Dwellings.—The slope is the main limitation, especially on sites for dwellings with basements. Special design helps to overcome this limitation. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—The slope is the main limitation. Special design will help to overcome this limitation.

Septic tank absorption fields.—The slope and the restricted permeability are the main limitations. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which effluent is absorbed. Installing the distribution lines on the contour and providing distribution boxes or similar structures will increase the efficiency of the system.

Capability classification.—IVe

MaE—Maplecrest gravelly silt loam, 25 to 45 percent slopes. This soil is very deep, steep, and well drained. It is on the sides of moraines and the lower parts of valleys in the Catskill Mountains. It formed in glacial till derived from reddish sandstone, siltstone, and shale. Slopes are generally convex. Areas are broad and irregular in shape and range from 5 to 100 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 8 inches, dark reddish brown gravelly silt loam that has 15 percent rock fragments

Subsoil:
- 8 to 18 inches, reddish brown gravelly loam that has 20 percent rock fragments
- 18 to 30 inches, reddish brown gravelly loam that has 25 percent rock fragments
- 30 to 50 inches, reddish brown gravelly loam that has 30 percent rock fragments

Substratum:
- 50 to 65 inches, reddish brown very gravelly sandy loam that has 50 percent rock fragments

Inclusions.—Included with this soil in mapping are the moderately deep Oquaga soils in small areas where bedrock is closer to the surface. Also included are areas of Lackawanna and Wellsboro soils, the gravelly Tunkhannock soils, and areas that are eroded or that have stones on the surface. Included areas are as much as 3 acres each in size and make up about 20 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and subsoil and moderate or moderately rapid in the substratum
Available water capacity: Moderate
Soil reaction: Strongly acid to slightly acid in the surface layer and subsoil and strongly acid or moderately acid in the substratum
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Very rapid
Erosion hazard: Very severe

Use.—Most areas of this soil are used as woodland or support brush.

Crops and pasture.—This soil is generally unsuited to cultivated crops and pasture. Erosion is the main hazard. The slope makes the use of equipment difficult and unsafe.

Woodland.—The potential productivity of this soil for red maple is moderate. The slope limits the use of equipment.

Dwellings.—The slope is the main limitation, especially on sites for dwellings with basements.

Local roads and streets.—The slope is the main limitation. Special design will help to overcome this limitation.

Septic tank absorption fields.—The slope and the restricted permeability are the main limitations.

Capability classification.—VIIe

MdB—Mardin gravelly silt loam, 3 to 8 percent slopes. This soil is very deep, gently sloping, and moderately well drained. It is on the convex parts of glaciated uplands. It formed in glacial till derived from sandstone, siltstone, and shale. Slopes are generally convex. Areas are long and narrow or irregular in shape and range from 5 to 100 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 9 inches, dark brown gravelly silt loam that has 25 percent rock fragments

Subsoil:
- 9 to 15 inches, yellowish brown gravelly silt loam that has 20 percent rock fragments
- 15 to 21 inches, light olive brown gravelly loam that has 20 percent rock fragments and has yellowish brown and dark brown mottles
- 21 to 60 inches, olive brown, very firm, dense and brittle gravelly loam that has 25 percent rock fragments and has dark brown and light olive gray mottles

Inclusions.—Included with this soil in mapping are the somewhat poorly drained Volusia and poorly drained and very poorly drained Alden soils in small seepy areas, drainageways, and depressions. Also included are areas of Wellsboro and Morris soils, areas of the well drained Valois soils on the slightly higher parts of the landscape, and areas that are eroded or that have stones and boulders on the surface. Included areas are as much as 3 acres each in size and make up about 25 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and the upper part of the subsoil and slow or very slow in the lower part of the subsoil
Available water capacity: Moderate
Soil reaction: Extremely acid to slightly acid in the surface layer and the upper part of the subsoil and very strongly acid to neutral in the lower part of the subsoil
Depth to the seasonal high water table: 1.5 to 2.0 feet (March through May)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Medium
Erosion hazard: Slight

Use.—Most areas of this soil are used for hay or pasture. Some areas are used for cultivated crops.

Crops and pasture.—This soil is well suited to cultivated crops. Wetness delays planting in some years. A conservation tillage system that leaves crop residue on the surface after planting will reduce the hazard of erosion. A subsurface drainage system will reduce the wetness in some areas. Properly managing crop residue and adding other organic material will help to maintain tilth.

This soil is well suited to pasture. Rotation grazing, proper stocking rates, applications of fertilizer, and weed control will increase forage yields.

Woodland.—The potential productivity of this soil for sugar maple is moderate. Few or no limitations affect woodland management.

Dwellings.—Wetness is the main limitation on sites for dwellings, especially those with basements. Grading so that surface water moves away from the dwellings, installing interceptor drains that divert water from the higher adjacent areas, and installing subsurface drains around foundations and footings will reduce the wetness.

Local roads and streets.—Wetness and the potential for frost action are the main limitations. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action. Raised fill and a drainage system will reduce the wetness.

Septic tank absorption fields.—Wetness and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept runoff from the higher adjacent areas. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which effluent is absorbed.

Capability classification.—IIw

MdC—Mardin gravelly silt loam, 8 to 15 percent slopes. This soil is very deep, strongly sloping, and moderately well drained. It is on ridges in the glaciated uplands. It formed in glacial till derived from sandstone, siltstone, and shale. Slopes are generally convex. Areas are long and narrow and range from 5 to 100 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 9 inches, dark brown gravelly silt loam that has 25 percent rock fragments
Subsoil:
9 to 15 inches, yellowish brown gravelly silt loam that has 20 percent rock fragments
15 to 21 inches, light olive brown gravelly loam that has 20 percent rock fragments and has yellowish brown and dark brown mottles
21 to 60 inches, olive brown, very firm, dense and brittle gravelly loam that has 25 percent rock fragments and has dark brown and light olive gray mottles

Inclusions.—Included with this soil in mapping are the somewhat poorly drained Volusia and poorly drained and very poorly drained Alden soils in small seepy areas, drainageways, and depressions. Also included are areas of Wellsboro and Morris soils, areas of the well drained Valois soils on the slightly higher parts of the landscape, and areas that are eroded or that have stones and boulders on the surface. Included areas are as much as 3 acres each in size and make up about 25 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and the upper part of the subsoil and slow or very slow in the lower part of the subsoil
Available water capacity: Moderate
Soil reaction: Extremely acid to slightly acid in the surface layer and the upper part of the subsoil and very strongly acid to neutral in the lower part of the subsoil

Depth to the seasonal high water table: 1.5 to 2.0 feet (March through May)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Medium
Erosion hazard: Moderate

Use.—Most areas of this soil are used for hay or pasture. Some areas are used for cultivated crops.

Crops and pasture.—This soil is moderately suited to cultivated crops. Erosion is a hazard, and wetness delays planting in some years. Contour farming or stripcropping and a conservation tillage system that leaves crop residue on the surface after planting will reduce the hazard of erosion. A subsurface drainage system will reduce the wetness in some areas. Properly managing crop residue and adding other organic material will help to maintain tilth.

This soil is well suited to pasture. Rotation grazing, proper stocking rates, applications of fertilizer, and weed control will increase forage yields.

Woodland.—The potential productivity of this soil for sugar maple is moderate. Few or no limitations affect woodland management.

Dwellings.—Wetness is the main limitation on sites for dwellings, especially those with basements. Installing subsurface drains around foundations and footings and backfilling with sand and gravel will reduce the wetness. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—Wetness, the slope, and the potential for frost action are the main limitations. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action. Raised fill and a drainage system will reduce the wetness. Land shaping or grading will help to overcome the slope.

Septic tank absorption fields.—Wetness and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept runoff from the higher adjacent areas. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which effluent is absorbed.

Capability classification.—IIIe

MdD—Mardin gravelly silt loam, 15 to 25 percent slopes. This soil is very deep, moderately steep, and moderately well drained. It is on ridges in the glaciated uplands. It formed in glacial till derived from sandstone, siltstone, and shale. Slopes are generally convex. Areas are long and narrow or irregular in shape and range from 5 to 40 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 9 inches, dark brown gravelly silt loam that has 25 percent rock fragments
Subsoil:
9 to 15 inches, yellowish brown gravelly silt loam that has 20 percent rock fragments
15 to 21 inches, light olive brown gravelly loam that has 20 percent rock fragments and has yellowish brown and dark brown mottles
21 to 60 inches, olive brown, very firm, dense and brittle gravelly loam that has 25 percent rock fragments and has dark brown and light olive gray mottles

Inclusions.—Included with this soil in mapping are the somewhat poorly drained Volusia and poorly drained and very poorly drained Alden soils in small seepy areas, drainageways, and depressions. Also included are areas of Wellsboro and Morris soils, areas of the well drained Valois soils on the slightly higher parts of the landscape, and areas that are eroded or that have stones and boulders on the surface. Included areas are as much as 3 acres each in size and make up about 20 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and the upper part of the subsoil and slow or very slow in the lower part of the subsoil
Available water capacity: Moderate
Soil reaction: Extremely acid to slightly acid in the surface layer and the upper part of the subsoil and very strongly acid to neutral in the lower part of the subsoil
Depth to the seasonal high water table: 1.5 to 2.0 feet (March through May)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Rapid
Erosion hazard: Severe

Use.—Most areas of this soil are used for hay or pasture. Some areas are used as woodland.

Crops and pasture.—This soil is poorly suited to cultivated crops. Erosion is a hazard, and wetness delays planting in some years. Contour farming or stripcropping, a crop rotation dominated by close-growing crops, and a conservation tillage system that leaves crop residue on the surface after planting will reduce the hazard of erosion. A subsurface drainage system will reduce the wetness in some areas. Properly managing crop residue and adding other organic

material will help to maintain tilth.

This soil is moderately suited to pasture. Deferment of grazing during wet periods will help to control erosion. Rotation grazing, proper stocking rates, applications of fertilizer, and weed control will increase forage yields.

Woodland.—The potential productivity of this soil for sugar maple is moderate. The slope limits the use of equipment.

Dwellings.—Wetness and the slope are the main limitations, especially on sites for dwellings with basements. The wetness can be reduced by installing subsurface drains around the foundations and backfilling with sand and gravel. Special design helps to overcome the slope. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—The slope is the main limitation. Special design or grading and filling will help to overcome this limitation.

Septic tank absorption fields.—Wetness, the slope, and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept runoff from the higher adjacent areas. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which effluent is absorbed. Installing the distribution lines on the contour and providing drop boxes or other structures that ensure even distribution of the effluent will increase the efficiency of the system.

Capability classification.—IVe

MeC—Mardin gravelly silt loam, 3 to 15 percent slopes, very stony. This soil is very deep, gently sloping to strongly sloping, and moderately well drained. It is on the sides of ridges on glaciated uplands. It formed in glacial till derived from sandstone, siltstone, and shale. Stones that are 10 to 24 inches in diameter cover as much as 3 percent of the surface. Slopes are generally convex. Areas are long and narrow and range from 5 to 85 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 9 inches, dark brown gravelly silt loam that has 25 percent rock fragments

Subsoil:
- 9 to 15 inches, yellowish brown gravelly silt loam that has 20 percent rock fragments
- 15 to 21 inches, light olive brown gravelly loam that has 20 percent rock fragments and has yellowish brown and dark brown mottles
- 21 to 60 inches, olive brown, very firm, dense and brittle gravelly loam that has 25 percent rock fragments and has dark brown and light olive gray mottles

Inclusions.—Included with this soil in mapping are the somewhat poorly drained Volusia and poorly drained and very poorly drained Alden soils in small seepy areas, drainageways, and depressions. Also included are areas of Wellsboro and Morris soils, areas of the well drained Valois soils on the slightly higher parts of the landscape, and areas that are eroded. Included areas are as much as 3 acres each in size and make up about 20 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and the upper part of the subsoil and slow or very slow in the lower part of the subsoil
Available water capacity: Moderate
Soil reaction: Extremely acid to slightly acid in the surface layer and the upper part of the subsoil and very strongly acid to neutral in the lower part of the subsoil
Depth to the seasonal high water table: 1.5 to 2.0 feet (March through May)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Medium
Erosion hazard: Moderate

Use.—Most areas of this soil are used as woodland. Some areas are used for hay or pasture.

Crops and pasture.—This soil is generally unsuited to cultivated crops and poorly suited to pasture. The stones on the surface are a major limitation. Erosion is a hazard, and wetness delays planting in some years. Deferment of grazing during wet or dry periods will help to prevent damage to the pasture. Rotation grazing, proper stocking rates, applications of fertilizer, and weed control will increase forage yields.

Woodland.—The potential productivity of this soil for sugar maple is moderate. Few or no limitations affect woodland management.

Dwellings.—Wetness is the main limitation on sites for dwellings, especially those with basements. Installing subsurface drains around foundations and footings and backfilling with sand and gravel will reduce the wetness. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—Wetness, the slope, and the potential for frost action are the main limitations. A coarse grained subgrade or base material to frost depth

will reduce the potential for frost action. Raised fill and a drainage system will reduce the wetness. Land shaping or grading will help to overcome the slope.

Septic tank absorption fields.—Wetness and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept runoff from the higher adjacent areas. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which effluent is absorbed.

Capability classification.—VIs

Mf—Medisaprists, ponded. This unit consists of very poorly drained, organic soils in level areas or depressions that commonly border streams, lakes, ponds, and other bodies of water. These areas are commonly called freshwater marshes. Slopes are less than 1 percent. Most areas are oblong and range from 3 to 50 acres in size.

The upper layer is black, decomposed organic material more than 16 inches thick. The underlying layers are silty clay to gravelly loamy sand. They extend to a depth of at least 60 inches.

Inclusions.—Included with these soils in mapping are areas of the poorly drained and very poorly drained Alden, Canandaigua, and Madalin soils on the slightly higher parts of the landscape. Also included are areas of Carlisle muck. Included areas are as much as 3 acres each in size and make up about 15 percent of the unit.

Use and suitability.—Most areas are covered with cattails, rushes, grasses, and other marsh vegetation. These soils are generally unsuited to most uses other than wetland wildlife habitat. Prolonged wetness, flooding or ponding, and humus are the major limitations.

Capability classification.—VIIIw

Mh—Medisaprists-Hydraquents complex, tidal marsh. This unit consists of very poorly drained, organic and mineral soils in level tidal areas bordering the Hudson River. These areas are commonly called tidal marshes. Slopes are less than 1 percent. Most areas are oblong and range from 3 to 50 acres in size. They are about 50 percent Medisaprists, 35 percent Hydraquents, and 15 percent other soils. These soils occur as areas so intricately intermingled that it was not practical to map them separately.

The upper layer of the Medisaprists is black, decomposed organic material more than 16 inches thick. The underlying layers are silty clay to gravelly loamy sand. They extend to a depth of at least 60 inches.

The Hydraquents have a thin surface layer of black or gray silt loam or silty clay loam. The underlying layers to a depth of 60 inches or more are gray to grayish green silt loam, silty clay loam, or silty clay.

Inclusions.—Included with these soils in mapping are areas of the poorly drained and very poorly drained Alden, Canandaigua, and Madalin soils on the slightly higher parts of the landscape. Also included are areas of Carlisle muck. Included areas are as much as 3 acres each in size.

Use and suitability.—Water generally covers this unit daily, causing severe if not impossible conditions for any type of farming, woodland, or development. Soil strength is mainly too low for the soils to support grazing animals. The unit is generally suitable for wildlife habitat.

Capability classification.—VIIIw

Mk—Middlebury silt loam. This soil is very deep, nearly level, and somewhat poorly drained. It is on flood plains. It formed in recent water-deposited sediments. Slopes range from 0 to 3 percent. Areas are long and narrow or irregular in shape and range from 5 to 120 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 7 inches, dark grayish brown silt loam

Subsoil:
- 7 to 15 inches, olive brown silt loam
- 15 to 26 inches, brown very fine sandy loam that has light brownish gray mottles

Substratum:
- 26 to 44 inches, brown fine sandy loam that has light brownish gray and yellowish brown mottles
- 44 to 60 inches, dark grayish brown, stratified gravelly fine sand

Inclusions.—Included with this soil in mapping are Tioga soils in the slightly higher areas and the poorly drained and very poorly drained Wayland soils in depressions. Also included are areas of Chenango soils on outwash terraces and Riverhead soils on valley benches. Included areas are as much as 5 acres each in size and make up 15 to 25 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer, subsoil, and the upper part of the substratum and moderately rapid or rapid in the lower part of the substratum

Available water capacity: Moderate

Soil reaction: Strongly acid to slightly acid in the surface layer and moderately acid to neutral in the subsoil and substratum

Depth to the seasonal high water table: 6 inches to 2 feet (February through April)
Flooding: Occasional and brief (November through May)
Depth to bedrock: More than 60 inches
Surface runoff: Very slow
Erosion hazard: None

Use.—Most areas are used for pasture or cultivated crops. Some areas are used as woodland. This soil is classified as prime farmland.

Crops and pasture.—This soil is well suited to cultivated crops. Seasonal wetness delays planting in some years. Flooding generally does not occur during the growing season. Shallow surface ditches and a subsurface drainage system will reduce the wetness in areas that have suitable outlets. Properly managing crop residue and adding other organic material will help to maintain tilth.

This soil is well suited to pasture. Deferment of grazing during wet periods will help to prevent damage to the pasture. Rotation grazing, proper stocking rates, and weed control will increase forage yields.

Woodland.—The potential productivity of this soil for northern red oak is moderately high. Few or no limitations affect woodland management.

Dwellings.—Flooding and seasonal wetness are the main management concerns, especially on sites for dwellings with basements.

Local roads and streets.—Flooding and the potential for frost action are the main management concerns. Raised fill of coarse grained material will help to overcome these limitations.

Septic tank absorption fields.—Flooding, wetness, and a poor filtering capacity are the main management concerns. The contamination of ground water is a hazard.

Capability classification.—IIw

MoA—Morris channery silt loam, 0 to 3 percent slopes. This soil is very deep, nearly level, and somewhat poorly drained. It is on the smooth parts of hills and plains in the Catskill Mountains and their foothills. It formed in firm glacial till derived from reddish sandstone, siltstone, and shale. Slopes are generally convex. Areas are broad and irregular in shape and range from 5 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 2 inches, dark brown channery silt loam that has 20 percent rock fragments
Subsoil:
2 to 15 inches, brown channery silt loam that has 25 percent rock fragments and has light brown mottles
15 to 20 inches, brown channery silt loam that has 30 percent rock fragments and has strong brown and light brownish gray mottles
20 to 30 inches, a fragipan of reddish brown, very brittle channery silt loam that has 30 percent rock fragments and has light brownish gray mottles
Substratum:
30 to 60 inches, weak red, very firm and brittle channery silt loam that has 30 percent rock fragments and has light brownish gray and yellowish red mottles

Inclusions.—Included with this soil in mapping are small areas of the poorly drained and very poorly drained Alden soils in depressions and drainageways. Also included are the moderately well drained Wellsboro and well drained Lackawanna soils in the slightly higher areas, the shallow Tuller soils, soils that are shallower to bedrock than the Morris soil, and soils that have stones and boulders on the surface. Included areas are as much as 5 acres each in size and make up about 25 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and the upper part of the subsoil and slow or very slow in the fragipan
Available water capacity: Moderate
Soil reaction: Very strongly acid to moderately acid in the surface layer and the upper part of the subsoil and very strongly acid in the fragipan
Depth to the seasonal high water table: 6 inches to 1.5 feet (November through March)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Slow
Erosion hazard: Slight

Use.—Most areas of this soil are used for hay or pasture. Some areas are used as woodland.

Crops and pasture.—This soil is moderately suited to cultivated crops. Seasonal wetness is the main limitation. A conservation tillage system that leaves crop residue on the surface after planting will help to control erosion. A subsurface drainage system will reduce the wetness. Properly managing crop residue and adding other organic material will help to maintain tilth.

This soil is well suited to pasture. Deferment of grazing during wet periods will help to prevent damage to the pasture. Rotation grazing, proper stocking rates, weed control, and applications of fertilizer will increase forage yields.

Woodland.—The potential productivity of this soil for northern red oak is moderately high. The fragipan restricts root growth and causes seedling mortality and windthrow. Seasonal wetness limits the use of equipment.

Dwellings.—Seasonal wetness is the main limitation on sites for dwellings, especially those with basements. Grading so that surface water moves away from the dwellings, installing interceptor drains that divert runoff from the higher adjacent areas, and installing drains around foundations and footings will reduce the wetness.

Local roads and streets.—Seasonal wetness and the potential for frost action are the main limitations. Raised fill and a drainage system will reduce the wetness. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action.

Septic tank absorption fields.—Seasonal wetness and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept runoff from the higher adjacent areas. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which effluent is absorbed.

Capability classification.—IIIw

MoB—Morris channery silt loam, 3 to 8 percent slopes. This soil is very deep, gently sloping, and somewhat poorly drained. It is on the lower parts of hills and ridges in the Catskill Mountains and their foothills. It formed in firm glacial till derived from reddish sandstone, siltstone, and shale. Slopes are generally convex. Areas are broad and irregular in shape and range from 5 to 100 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 2 inches, dark brown channery silt loam that has 20 percent rock fragments

Subsoil:
- 2 to 15 inches, brown channery silt loam that has 25 percent rock fragments and has light brown mottles
- 15 to 20 inches, brown channery silt loam that has 30 percent rock fragments and has strong brown and light brownish gray mottles
- 20 to 30 inches, a fragipan of reddish brown, very brittle channery silt loam that has 30 percent rock fragments and has light brownish gray mottles

Substratum:
- 30 to 60 inches, weak red, very firm and brittle channery silt loam that has 30 percent rock fragments and has light brownish gray and yellowish red mottles

Inclusions.—Included with this soil in mapping are small areas of the poorly drained and very poorly drained Alden soils in depressions and drainageways. Also included are the moderately well drained Wellsboro and well drained Lackawanna soils in the slightly higher areas, the shallow Tuller soils, soils that are shallower to bedrock than the Morris soil, soils that have stones and boulders on the surface, and soils that are eroded. Included areas are as much as 5 acres each in size and make up about 20 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and the upper part of the subsoil and slow or very slow in the fragipan
Available water capacity: Moderate
Soil reaction: Very strongly acid to moderately acid in the surface layer and the upper part of the subsoil and very strongly acid in the fragipan
Depth to the seasonal high water table: 6 inches to 1.5 feet (November through March)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Medium
Erosion hazard: Slight

Use.—Most areas of this soil are used for hay or pasture. Some areas are used as woodland.

Crops and pasture.—This soil is moderately suited to cultivated crops. Seasonal wetness is the main limitation. A conservation tillage system that leaves crop residue on the surface after planting will help to control erosion. A subsurface drainage system will reduce the wetness. Properly managing crop residue and adding other organic material will help to maintain tilth.

This soil is well suited to pasture. Deferment of grazing during wet periods will help to prevent damage to the pasture. Rotation grazing, proper stocking rates, weed control, and applications of fertilizer will increase forage yields.

Woodland.—The potential productivity of this soil for northern red oak is moderately high. The fragipan restricts root growth and causes seedling mortality and windthrow. Seasonal wetness limits the use of equipment.

Dwellings.—Seasonal wetness is the main limitation on sites for dwellings, especially those with basements. Grading so that surface water moves away from the dwellings, installing interceptor drains that divert runoff from the higher adjacent areas, and installing drains around foundations and footings will reduce the wetness.

Local roads and streets.—Seasonal wetness and the potential for frost action are the main limitations. Raised fill and a drainage system will reduce the wetness. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action.

Septic tank absorption fields.—Seasonal wetness and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept runoff from the higher adjacent areas. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which effluent is absorbed.

Capability classification.—IIIw

MoC—Morris channery silt loam, 8 to 15 percent slopes. This soil is very deep, strongly sloping, and somewhat poorly drained. It is on the top and sides of hills and ridges in the Catskill Mountains and their foothills. It formed in firm glacial till derived from reddish sandstone, siltstone, and shale. Slopes are generally convex. Areas are broad and irregular in shape and range from 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 2 inches, dark brown channery silt loam that has 20 percent rock fragments

Subsoil:
- 2 to 15 inches, brown channery silt loam that has 25 percent rock fragments and has light brown mottles
- 15 to 20 inches, brown channery silt loam that has 30 percent rock fragments and has strong brown and light brownish gray mottles
- 20 to 30 inches, a fragipan of reddish brown, very brittle channery silt loam that has 30 percent rock fragments and has light brownish gray mottles

Substratum:
- 30 to 60 inches, weak red, very firm and brittle channery silt loam that has 30 percent rock fragments and has light brownish gray and yellowish red mottles

Inclusions.—Included with this soil in mapping are small areas of the poorly drained and very poorly drained Alden soils in depressions and drainageways. Also included are the moderately well drained Wellsboro and well drained Lackawanna soils in the slightly higher areas, the shallow Tuller soils, soils that are shallower to bedrock than the Morris soil, soils that have stones and boulders on the surface, and soils that are eroded. Included areas are as much as 5 acres each in size and make up about 25 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and the upper part of the subsoil and slow or very slow in the fragipan
Available water capacity: Moderate
Soil reaction: Very strongly acid to moderately acid in the surface layer and the upper part of the subsoil and very strongly acid in the fragipan
Depth to the seasonal high water table: 6 inches to 1.5 feet (November through March)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Medium
Erosion hazard: Moderate

Use.—Most areas of this soil are used for hay or pasture. Some areas are used as woodland.

Crops and pasture.—This soil is moderately suited to cultivated crops. Seasonal wetness and erosion are the main management concerns. Contour farming or stripcropping and a conservation tillage system that leaves crop residue on the surface after planting will help to control erosion. A subsurface drainage system will reduce the wetness. Properly managing crop residue and adding other organic material will help to maintain tilth.

This soil is well suited to pasture. Deferment of grazing during wet periods will help to prevent damage to the pasture. Rotation grazing, proper stocking rates, weed control, and applications of fertilizer will increase forage yields.

Woodland.—The potential productivity of this soil for northern red oak is moderately high. The fragipan restricts root growth and causes seedling mortality and windthrow. Seasonal wetness limits the use of equipment.

Dwellings.—Seasonal wetness is the main limitation on sites for dwellings, especially those with basements. Grading so that surface water moves away from the dwellings, installing interceptor drains that divert runoff from the higher adjacent areas, and installing drains around foundations and footings will reduce the wetness. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—Seasonal wetness and the potential for frost action are the main limitations. Raised fill and a drainage system will reduce the wetness. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action.

Septic tank absorption fields.—Seasonal wetness and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which

can intercept runoff from the higher adjacent areas. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which effluent is absorbed.

Capability classification.—IIe

MpC—Morris channery silt loam, 3 to 15 percent slopes, very stony. This soil is very deep, gently sloping to strongly sloping, and somewhat poorly drained. It is on the top and sides of hills and ridges in the Catskill Mountains and their foothills. It formed in firm glacial till derived from reddish sandstone, siltstone, and shale. Stones that are 10 to 24 inches in diameter cover as much as 3 percent of the surface. Slopes are generally convex. Areas are broad and irregular in shape and range from 5 to 75 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 2 inches, dark brown channery silt loam that has 20 percent rock fragments

Subsoil:
- 2 to 15 inches, brown channery silt loam that has 25 percent rock fragments and has light brown mottles
- 15 to 20 inches, brown channery silt loam that has 30 percent rock fragments and has strong brown and light brownish gray mottles
- 20 to 30 inches, a fragipan of reddish brown, very brittle channery silt loam that has 30 percent rock fragments and has light brownish gray mottles

Substratum:
- 30 to 60 inches, weak red, very firm and brittle channery silt loam that has 30 percent rock fragments and has light brownish gray and yellowish red mottles

Inclusions.—Included with this soil in mapping are small areas of the poorly drained and very poorly drained Alden soils in depressions and drainageways. Also included are the moderately well drained Wellsboro and well drained Lackawanna soils in the slightly higher areas, the shallow Tuller soils, soils that are shallower to bedrock than the Morris soil, and soils that are eroded. Included areas are as much as 5 acres each in size and make up about 25 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and the upper part of the subsoil and slow or very slow in the fragipan
Available water capacity: Moderate
Soil reaction: Very strongly acid to moderately acid in the surface layer and the upper part of the subsoil and very strongly acid in the fragipan
Depth to the seasonal high water table: 6 inches to 1.5 feet (November through March)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Medium
Erosion hazard: Moderate

Use.—Most areas of this soil are used as woodland. Some areas are used for hay or pasture.

Crops and pasture.—This soil is generally unsuited to cultivated crops and poorly suited to pasture. Seasonal wetness, the stones on the surface, and erosion are the main management concerns. Deferment of grazing during wet periods will help to prevent damage to the pasture. Rotation grazing, proper stocking rates, weed control, and applications of fertilizer will increase forage yields.

Woodland.—The potential productivity of this soil for northern red oak is moderately high. The fragipan restricts root growth and causes seedling mortality and windthrow. Seasonal wetness limits the use of equipment.

Dwellings.—Seasonal wetness is the main limitation on sites for dwellings, especially those with basements. Grading so that surface water moves away from the dwellings, installing interceptor drains that divert runoff from the higher adjacent areas, and installing drains around foundations and footings will reduce the wetness. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—Seasonal wetness and the potential for frost action are the main limitations. Raised fill and a drainage system will reduce the wetness. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action.

Septic tank absorption fields.—Seasonal wetness and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept runoff from the higher adjacent areas. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which effluent is absorbed.

Capability classification.—VIs

NaC—Nassau channery silt loam, rolling. This soil is shallow and somewhat excessively drained. It is on bedrock-controlled ridges and side slopes in the eastern part of the county. It formed in glacial till derived from slate and shale. Slopes range from 5 to 16 percent. Areas are irregular in shape and range from 5 to 150 acres in size.

Typically, the surface is covered by 1 inch of decomposed leaves and moss. The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 3 inches, dark brown channery silt loam that has 15 percent rock fragments
Subsoil:
3 to 13 inches, brown very channery silt loam that has 60 percent rock fragments
13 to 18 inches, yellowish brown extremely channery silt loam that has 70 percent rock fragments
Bedrock:
18 inches, gray and light gray shale

Inclusions.—Included with this soil in mapping are small areas of soils that are similar to the Nassau soil but are very shallow to bedrock or are underlain by sandstone. Also included are the very deep Valois soils between bedrock ridges, the very deep Hudson soils in depressions, eroded areas, and areas of bedrock outcrops and ledges. Included areas are as much as 5 acres each in size and make up about 15 to 25 percent of the unit.

Major soil properties—

Permeability: Moderate throughout the profile
Available water capacity: Very low
Soil reaction: Very strongly acid or strongly acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 10 to 20 inches
Surface runoff: Medium
Erosion hazard: Severe

Use.—Most areas of this soil are used as woodland. Some areas are used for hay or pasture.

Crops and pasture.—This soil is poorly suited to cultivated crops and moderately suited to pasture. The available water capacity and the erosion hazard are the main management concerns. Deferment of grazing during droughty periods and controlled grazing will increase forage yields and reduce the hazard of erosion. Rotation grazing, proper stocking rates, weed control, and applications of fertilizer will increase forage yields.

Woodland.—The potential productivity of this soil for sugar maple is moderate. The depth to bedrock causes seedling mortality and windthrow.

Dwellings.—The depth to bedrock is the main limitation, especially on sites for dwellings with basements. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—The depth to bedrock is the main limitation. Planning road locations and grades so that rock removal is not needed and adding fill material will minimize this limitation.

Septic tank absorption fields.—The depth to bedrock is the main limitation. A poor filtering capacity is a limitation, and contamination of the ground water is a hazard.

Capability classification.—IVe

NrC—Nassau channery silt loam, rolling, very rocky. This soil is shallow and somewhat excessively drained. It is on bedrock-controlled ridges and side slopes in the eastern part of the county. It formed in glacial till derived from slate and shale. Rock outcrop covers 2 to 10 percent of the surface. Slopes range from 5 to 16 percent. Areas are irregular in shape and range from 5 to 150 acres in size.

Typically, the surface is covered by 1 inch of decomposed leaves and moss. The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 3 inches, dark brown channery silt loam that has 15 percent rock fragments
Subsoil:
3 to 13 inches, brown very channery silt loam that has 60 percent rock fragments
13 to 18 inches, yellowish brown extremely channery silt loam that has 70 percent rock fragments
Bedrock:
18 inches, gray and light gray shale

Inclusions.—Included with this soil in mapping are small areas of soils that are similar to the Nassau soil but are very shallow to bedrock or are underlain by sandstone. Also included are the very deep Valois soils between bedrock ridges, the very deep Hudson soils in depressions, and eroded areas. Included areas are as much as 5 acres each in size and make up about 15 to 25 percent of the unit.

Major soil properties—

Permeability: Moderate throughout the profile
Available water capacity: Very low
Soil reaction: Very strongly acid or strongly acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 10 to 20 inches
Surface runoff: Medium

Erosion hazard: Severe

Use.—Most areas of this soil are used as woodland. Some areas are used for hay or pasture.

Crops and pasture.—This soil is poorly suited to cultivated crops and pasture. The rock outcrops, the available water capacity, and the erosion hazard are the main management concerns. Deferment of grazing during droughty periods and controlled grazing will increase forage yields and reduce the hazard of erosion. Rotation grazing, proper stocking rates, weed control, and applications of fertilizer will increase forage yields.

Woodland.—The potential productivity of this soil for sugar maple is moderate. The depth to bedrock causes seedling mortality and windthrow.

Dwellings.—The depth to bedrock is the main limitation, especially on sites for dwellings with basements. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—The depth to bedrock is the main limitation. Planning road locations and grades so that rock removal is not needed and adding fill material will minimize this limitation.

Septic tank absorption fields.—The depth to bedrock is the main limitation. A poor filtering capacity is a limitation, and contamination of the ground water is a hazard.

Capability classification.—VIs

NrD—Nassau channery silt loam, hilly, very rocky. This soil is shallow and somewhat excessively drained. It is on bedrock-controlled ridges and side slopes in the eastern part of the county. It formed in glacial till derived from slate and shale. Rock outcrop covers 2 to 10 percent of the surface. Slopes range from 15 to 25 percent. Areas are irregular in shape and range from 5 to 150 acres in size.

Typically, the surface is covered by 1 inch of decomposed leaves and moss. The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 3 inches, dark brown channery silt loam that has 15 percent rock fragments

Subsoil:
3 to 13 inches, brown very channery silt loam that has 60 percent rock fragments
13 to 18 inches, yellowish brown extremely channery silt loam that has 70 percent rock fragments

Bedrock:
18 inches, gray and light gray shale

Inclusions.—Included with this soil in mapping are small areas of soils that are similar to the Nassau soil but are very shallow to bedrock or are underlain by sandstone. Also included are the very deep Valois soils between bedrock ridges, the very deep Hudson soils in depressions, and eroded areas. Included areas are as much as 5 acres each in size and make up about 15 to 25 percent of the unit.

Major soil properties—

Permeability: Moderate throughout the profile
Available water capacity: Very low
Soil reaction: Very strongly acid or strongly acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 10 to 20 inches
Surface runoff: Rapid
Erosion hazard: Very severe

Use.—Most areas of this soil are used as woodland. Some areas are used for hay or pasture.

Crops and pasture.—This soil is generally unsuited to cultivated crops and poorly suited to pasture. The available water capacity, the rock outcrops, and the erosion hazard are the main management concerns. Deferment of grazing during droughty periods and controlled grazing will increase forage yields and reduce the hazard of erosion. Rotation grazing, proper stocking rates, weed control, and applications of fertilizer will increase forage yields.

Woodland.—The potential productivity of this soil for sugar maple is moderate. The depth to bedrock causes seedling mortality and windthrow. The slope limits the use of equipment.

Dwellings.—The depth to bedrock and the slope are the main limitations, especially on sites for dwellings with basements.

Local roads and streets.—The depth to bedrock and the slope are the main limitations. Planning road locations and grades so that rock removal is not needed and adding fill material will help to overcome the depth to bedrock. Special design and grading will help to overcome the slope.

Septic tank absorption fields.—The depth to bedrock and the slope are the main limitations. A poor filtering capacity, contamination of the ground water, and side-slope seepage of effluent are management concerns.

Capability classification.—VIs

NrE—Nassau channery silt loam, steep, very rocky. This soil is shallow and somewhat excessively drained. It is on bedrock-controlled ridges and side slopes in the eastern part of the county. It formed in

glacial till derived from slate and shale. Rock outcrop covers 2 to 10 percent of the surface. Slopes range from 25 to 45 percent. Areas are irregular in shape and range from 5 to 70 acres in size.

Typically, the surface is covered by 1 inch of decomposed leaves and moss. The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 3 inches, dark brown channery silt loam that has 15 percent rock fragments
Subsoil:
3 to 13 inches, brown very channery silt loam that has 60 percent rock fragments
13 to 18 inches, yellowish brown extremely channery silt loam that has 70 percent rock fragments
Bedrock:
18 inches, gray and light gray shale

Inclusions.—Included with this soil in mapping are small areas of soils that are similar to the Nassau soil but are very shallow to bedrock or are underlain by sandstone. Also included are the very deep Valois soils between bedrock ridges, the very deep Hudson soils in depressions, and eroded areas. Included areas are as much as 5 acres each in size and make up about 15 to 25 percent of the unit.

Major soil properties—

Permeability: Moderate throughout the profile
Available water capacity: Very low
Soil reaction: Very strongly acid or strongly acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 10 to 20 inches
Surface runoff: Very rapid
Erosion hazard: Very severe

Use.—Most areas of this soil are used as woodland. Some areas are used for hay or pasture.

Crops and pasture.—This soil is generally unsuited to cultivated crops and pasture. The available water capacity, the rock outcrops, and the erosion hazard are the main management concerns.

Woodland.—The potential productivity of this soil for sugar maple is moderate. The depth to bedrock causes seedling mortality and windthrow. The slope limits the use of equipment and causes an erosion hazard.

Dwellings.—The depth to bedrock and the slope are the main limitations, especially on sites for dwellings with basements.

Local roads and streets.—The depth to bedrock and the slope are the main limitations. Planning road locations and grades so that rock removal is not needed and adding fill material will help to overcome the depth to bedrock. Special design and grading will help to overcome the slope.

Septic tank absorption fields.—The depth to bedrock and the slope are the main limitations. A poor filtering capacity, contamination of the ground water, and side-slope seepage of effluent are management concerns.

Capability classification.—VIIe

NuB—Nunda silt loam, 3 to 8 percent slopes. This soil is very deep, gently sloping, and moderately well drained. It is on the smooth parts of glaciated ridges on uplands. It formed in glacial till influenced by shale. Slopes are smooth and convex. Areas are irregular in shape and range from 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, dark brown silt loam
Subsoil:
8 to 15 inches, dark grayish brown silt loam that has grayish brown coatings
15 to 28 inches, brown gravelly silty clay loam that has yellowish brown and grayish brown mottles
28 to 40 inches, dark grayish brown silt loam that has yellowish brown mottles
Substratum:
40 to 65 inches, dark grayish brown silt loam that has yellowish brown mottles

Inclusions.—Included with this soil in mapping are small areas of the somewhat poorly drained Burdett and poorly drained and very poorly drained Lyons soils on the lower parts of the landscape. Also included are areas of the somewhat poorly drained Volusia soils in shallow drainageways, the shallow Tuller soils, soils that are eroded, and soils that have stones on the surface. Included areas are as much as 5 acres each in size and make up about 15 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and the upper part of the subsoil, moderately slow in the lower part of the subsoil, and slow or very slow in the substratum
Available water capacity: High
Soil reaction: Strongly acid to neutral in the surface layer and subsoil and slightly acid to moderately alkaline in the substratum
Depth to the seasonal high water table: 1.5 to 2.0 feet (March through May)

Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Medium
Erosion hazard: Slight

Use.—Most areas of this soil are used for hay or pasture. Some areas are used as woodland.

Crops and pasture.—This soil is well suited to cultivated crops. Some long slopes are susceptible to erosion, and wetness delays planting in some years. Contour farming or stripcropping and a conservation tillage system that leaves crop residue on the surface after planting will reduce the hazard of erosion. A subsurface drainage system that includes drains in the lower areas will reduce the wetness.

This soil is well suited to pasture. Deferment of grazing during wet periods will help to keep the pasture in good condition. Rotation grazing, weed control, proper stocking rates, and applications of fertilizer will increase forage yields.

Woodland.—The potential productivity of this soil for sugar maple is moderate. Few or no limitations affect woodland management.

Dwellings.—Wetness is the main limitation, especially on sites for dwellings with basements. Grading so that surface water moves away from the dwellings, installing interceptor drains that divert water from the higher adjacent areas, installing drains around footings and foundations, and sealing the foundations will reduce the wetness.

Local roads and streets.—The potential for frost action is the main limitation. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action.

Septic tank absorption fields.—Wetness and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept runoff from the higher adjacent areas. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which effluent is absorbed.

Capability classification.—IIe

NuC—Nunda silt loam, 8 to 15 percent slopes. This soil is very deep, strongly sloping, and moderately well drained. It is on the top and sides of glaciated ridges on uplands. It formed in glacial till influenced by shale. Slopes are smooth and convex. Areas are irregular in shape and range from 5 to 75 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, dark brown silt loam

Subsoil:
8 to 15 inches, dark grayish brown silt loam that has grayish brown coatings
15 to 28 inches, brown gravelly silty clay loam that has yellowish brown and grayish brown mottles
28 to 40 inches, dark grayish brown silt loam that has yellowish brown mottles

Substratum:
40 to 65 inches, dark grayish brown silt loam that has yellowish brown mottles

Inclusions.—Included with this soil in mapping are small areas of the somewhat poorly drained Burdett and poorly drained and very poorly drained Lyons soils on the lower parts of the landscape. Also included are areas of the somewhat poorly drained Volusia soils in shallow drainageways, the shallow Tuller soils, soils that are eroded, and soils that have stones on the surface. Included areas are as much as 5 acres each in size and make up about 15 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and the upper part of the subsoil, moderately slow in the lower part of the subsoil, and slow or very slow in the substratum
Available water capacity: High
Soil reaction: Strongly acid to neutral in the surface layer and subsoil and slightly acid to moderately alkaline in the substratum
Depth to the seasonal high water table: 1.5 to 2.0 feet (March through May)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Medium
Erosion hazard: Moderate

Use.—Most areas of this soil are used for hay or pasture. Some areas are used as woodland.

Crops and pasture.—This soil is moderately suited to cultivated crops. Some long slopes are susceptible to erosion, and wetness delays planting in some years. Contour farming or stripcropping and a conservation tillage system that leaves crop residue on the surface after planting will reduce the hazard of erosion. A crop rotation dominated by close-growing crops helps to control erosion on long slopes. A subsurface drainage system that includes drains in the lower areas will reduce the wetness.

This soil is well suited to pasture. Deferment of grazing during wet periods will help to keep the pasture in good condition. Rotation grazing, weed control, proper stocking rates, and applications of fertilizer will increase forage yields.

Woodland.—The potential productivity of this soil for

sugar maple is moderate. Few or no limitations affect woodland management.

Dwellings.—Wetness is the main limitation, especially on sites for dwellings with basements. Grading so that surface water moves away from the dwellings, installing interceptor drains that divert water from the higher adjacent areas, installing drains around footings and foundations, and sealing the foundations will reduce the wetness.

Local roads and streets.—The potential for frost action is the main limitation. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action.

Septic tank absorption fields.—Wetness and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept runoff from the higher adjacent areas. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which effluent is absorbed.

Capability classification.—IIIe

NuD—Nunda silt loam, 15 to 25 percent slopes. This soil is very deep, moderately steep, and moderately well drained. It is on the top and sides of glaciated ridges on uplands. It formed in glacial till influenced by shale. Slopes are smooth and convex. Areas are irregular in shape and range from 5 to 75 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, dark brown silt loam

Subsoil:
8 to 15 inches, dark grayish brown silt loam that has grayish brown coatings
15 to 28 inches, brown gravelly silty clay loam that has yellowish brown and grayish brown mottles
28 to 40 inches, dark grayish brown silt loam that has yellowish brown mottles

Substratum:
40 to 65 inches, dark grayish brown silt loam that has yellowish brown mottles

Inclusions.—Included with this soil in mapping are small areas of the somewhat poorly drained Burdett and poorly drained and very poorly drained Lyons soils on the lower parts of the landscape. Also included are areas of the somewhat poorly drained Volusia soils in shallow drainageways, the shallow Tuller soils, soils that are eroded, and soils that have stones on the surface. Included areas are as much as 5 acres each in size and make up about 20 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and the upper part of the subsoil, moderately slow in the lower part of the subsoil, and slow or very slow in the substratum
Available water capacity: High
Soil reaction: Strongly acid to neutral in the surface layer and subsoil and slightly acid to moderately alkaline in the substratum
Depth to the seasonal high water table: 1.5 to 2.0 feet (March through May)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Rapid
Erosion hazard: Severe

Use.—Most areas of this soil are used for hay or pasture. Some areas are used as woodland.

Crops and pasture.—This soil is poorly suited to cultivated crops. Erosion is a major hazard, and wetness delays planting in some years. Contour farming or stripcropping and a conservation tillage system that leaves crop residue on the surface after planting will reduce the hazard of erosion. A crop rotation dominated by close-growing crops helps to control erosion on long slopes. A subsurface drainage system that includes drains in the lower areas will reduce the wetness.

This soil is moderately suited to pasture. Deferment of grazing during wet periods will help to keep the pasture in good condition. Rotation grazing, weed control, proper stocking rates, and applications of fertilizer will increase forage yields.

Woodland.—The potential productivity of this soil for sugar maple is moderate. The slope limits the use of equipment.

Dwellings.—Wetness and the slope are the main limitations, especially on sites for dwellings with basements. Installing interceptor drains that divert water from the higher adjacent areas, installing drains around footings and foundations, and sealing the foundations will reduce the wetness. Special design will help to overcome the slope. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—The potential for frost action and the slope are the main limitations. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action. Special design will help to overcome the slope.

Septic tank absorption fields.—Wetness, the slope, and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept runoff from the higher adjacent areas.

Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which effluent is absorbed. Installing the distribution lines on the contour or providing drop boxes or similar structures will increase the efficiency of the system.

Capability classification.—IVe

NuE—Nunda silt loam, 25 to 35 percent slopes. This soil is very deep, steep, and moderately well drained. It is on the sides of glaciated ridges on uplands. It formed in glacial till influenced by shale. Slopes are smooth and convex. Areas are irregular in shape and range from 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 8 inches, dark brown silt loam

Subsoil:
- 8 to 15 inches, dark grayish brown silt loam that has grayish brown coatings
- 15 to 28 inches, brown gravelly silty clay loam that has yellowish brown and grayish brown mottles
- 28 to 40 inches, dark grayish brown silt loam that has yellowish brown mottles

Substratum:
- 40 to 65 inches, dark grayish brown silt loam that has yellowish brown mottles

Inclusions.—Included with this soil in mapping are small areas of the somewhat poorly drained Burdett and poorly drained and very poorly drained Lyons soils on the lower parts of the landscape. Also included are areas of the somewhat poorly drained Volusia soils in shallow drainageways, the shallow Tuller soils, soils that are eroded, and soils that have stones on the surface. Included areas are as much as 5 acres each in size and make up about 20 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and the upper part of the subsoil, moderately slow in the lower part of the subsoil, and slow or very slow in the substratum
Available water capacity: High
Soil reaction: Strongly acid to neutral in the surface layer and subsoil and slightly acid to moderately alkaline in the substratum
Depth to the seasonal high water table: 1.5 to 2.0 feet (March through May)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Very rapid
Erosion hazard: Very severe

Use.—Most areas of this soil are used as woodland. A few areas are used as pasture.

Crops and pasture.—This soil is generally unsuited to cultivated crops and poorly suited to pasture. Erosion and the slope are the major management concerns. Deferment of grazing during wet periods will help to keep the pasture in good condition. Rotation grazing, weed control, proper stocking rates, and applications of fertilizer will increase forage yields.

Woodland.—The potential productivity of this soil for sugar maple is moderate. The slope limits the use of equipment and causes seedling mortality and windthrow.

Dwellings.—The slope is the major limitation.

Local roads and streets.—The slope is the main limitation. Special design will help to overcome this limitation.

Septic tank absorption fields.—Wetness, the slope, and the restricted permeability are the main limitations.

Capability classification.—VIe

NvC—Nunda silt loam, 3 to 15 percent slopes, very stony. This soil is very deep, gently sloping to strongly sloping, and moderately well drained. It is on the top and sides of glaciated ridges on uplands. It formed in glacial till influenced by shale. Stones that are 10 to 24 inches in diameter cover as much as 3 percent of the surface. Slopes are smooth and convex. Areas are irregular in shape and range from 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 8 inches, dark brown silt loam

Subsoil:
- 8 to 15 inches, dark grayish brown silt loam that has grayish brown coatings
- 15 to 28 inches, brown gravelly silty clay loam that has yellowish brown and grayish brown mottles
- 28 to 40 inches, dark grayish brown silt loam that has yellowish brown mottles

Substratum:
- 40 to 65 inches, dark grayish brown silt loam that has yellowish brown mottles

Inclusions.—Included with this soil in mapping are small areas of the somewhat poorly drained Burdett and poorly drained and very poorly drained Lyons soils on the lower parts of the landscape. Also included are areas of the somewhat poorly drained Volusia soils in shallow drainageways, the shallow Tuller soils, soils that are eroded, and soils that have no stones on the surface. Included areas are as much as 5 acres each in size and make up about 15 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and the upper part of the subsoil, moderately slow in the lower part of the subsoil, and slow or very slow in the substratum
Available water capacity: High
Soil reaction: Strongly acid to neutral in the surface layer and subsoil and slightly acid to moderately alkaline in the substratum
Depth to the seasonal high water table: 1.5 to 2.0 feet (March through May)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Medium
Erosion hazard: Moderate

Use.—Most areas of this soil are used as woodland. Some areas are used as pasture.

Crops and pasture.—This soil is generally unsuited to cultivated crops and poorly suited to pasture. The stones on the surface and the slope are major limitations, and wetness delays planting in some years. Deferment of grazing during wet periods will help to keep the pasture in good condition. Rotation grazing, weed control, proper stocking rates, and applications of fertilizer will increase forage yields.

Woodland.—The potential productivity of this soil for sugar maple is moderate. Few or no limitations affect woodland management.

Dwellings.—Wetness is the main limitation, especially on sites for dwellings with basements. Grading so that surface water moves away from the dwellings, installing interceptor drains that divert water from the higher adjacent areas, installing drains around footings and foundations, and sealing the foundations will reduce the wetness.

Local roads and streets.—Wetness and the potential for frost action are the main limitations. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action. Raised fill and a drainage system will reduce the wetness.

Septic tank absorption fields.—Wetness and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept runoff from the higher adjacent areas. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which effluent is absorbed.

Capability classification.—VIs

NvE—Nunda silt loam, 15 to 35 percent slopes, very stony. This soil is very deep, moderately steep and steep, and moderately well drained. It is on the sides of glaciated ridges on uplands. It formed in glacial till influenced by shale. Stones that are 10 to 24 inches in diameter cover as much as 3 percent of the surface. Slopes are smooth and convex. Areas are irregular in shape and range from 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, dark brown silt loam
Subsoil:
8 to 15 inches, dark grayish brown silt loam that has grayish brown coatings
15 to 28 inches, brown gravelly silty clay loam that has yellowish brown and grayish brown mottles
28 to 40 inches, dark grayish brown silt loam that has yellowish brown mottles
Substratum:
40 to 65 inches, dark grayish brown silt loam that has yellowish brown mottles

Inclusions.—Included with this soil in mapping are small areas of the somewhat poorly drained Burdett and poorly drained and very poorly drained Lyons soils on the lower parts of the landscape. Also included are areas of the somewhat poorly drained Volusia soils in shallow drainageways, the shallow Tuller soils, soils that are eroded, and soils that have no stones on the surface. Included areas are as much as 5 acres each in size and make up about 20 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and the upper part of the subsoil, moderately slow in the lower part of the subsoil, and slow or very slow in the substratum
Available water capacity: High
Soil reaction: Strongly acid to neutral in the surface layer and subsoil and slightly acid to moderately alkaline in the substratum
Depth to the seasonal high water table: 1.5 to 2.0 feet (March through May)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Rapid
Erosion hazard: Severe

Use.—Most areas of this soil are used as woodland. A few areas are used as pasture.

Crops and pasture.—This soil is generally unsuited to cultivated crops and pasture. The stones on the surface, erosion, and the slope are the major management concerns. Wetness is a limitation in some years.

Woodland.—The potential productivity of this soil for

sugar maple is moderate. The slope limits the use of equipment and causes seedling mortality and windthrow.

Dwellings.—The slope is the major limitation.

Local roads and streets.—The slope is the main limitation. Special design will help to overcome this limitation.

Septic tank absorption fields.—Wetness, the slope, and the restricted permeability are the main limitations.

Capability classification.—VIIs

Oc—Ochrepts, frequently flooded. These soils are very deep, nearly level to gently sloping, and excessively drained to moderately well drained. They are on flood plains and in channel bars and intermittent drainageways. They formed in recent water-deposited sediments. Slopes range from 0 to 8 percent. Areas are oval or irregular in shape and range from 3 to 10 acres in size.

The common sequence, depth, and composition of the layers of these soils are as follows—

Surface layer:
0 to 5 inches, reddish brown channery loam

Subsoil:
5 to 28 inches, yellowish red and reddish brown channery and very channery loam

Substratum:
28 to 60 inches, reddish yellow very channery loam

Inclusions.—Included with these soils in mapping are small areas of Lewbeach and Willowemoc soils, some of which have stones on the surface. Also included are small areas of Wayland and Barbour soils and a few areas of Tunkhannock soils. Included areas are as much as 3 acres each in size and make up 25 percent of the unit.

Major soil properties—

Permeability: Mainly moderate or moderately rapid throughout the profile
Available water capacity: Moderate or high
Soil reaction: Variable
Depth to the seasonal high water table: At least 3 feet
Depth to bedrock: Mainly more than 60 inches

Use.—Most areas of this unit are used as woodland. Some areas are used as pasture.

Crops and pasture.—This unit is generally unsuited to cultivated crops and poorly suited to pasture. Channeling, gouging, and dissection are the major hazards in unprotected areas.

Woodland.—The potential productivity of this unit for woodland is moderately high. Seedling mortality is high, and gullying and channeling are hazards. The ravines and channels limit the use of equipment.

Dwellings, septic tank absorption fields, and local roads and streets.—Flooding and channeling are the major management concerns, and the debris deposited by floodwater is a problem.

Capability classification.—None

OnB—Onteora silt loam, 3 to 8 percent slopes. This soil is very deep, gently sloping, and somewhat poorly drained. It is on the smooth parts of glaciated hills at the higher elevations in the Catskill Mountains. It formed in glacial till derived from reddish shale, sandstone, and siltstone. Slopes are smooth and convex. Areas are irregular in shape and range from 5 to 90 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 9 inches, dark reddish brown silt loam that has 10 percent rock fragments

Subsoil:
9 to 14 inches, reddish brown gravelly loam that has dark yellowish brown and light brown mottles
14 to 25 inches, a fragipan of reddish brown, very firm and brittle gravelly silt loam that has brownish yellow mottles and 25 percent rock fragments
25 to 43 inches, a fragipan of dark reddish brown, very firm and brittle gravelly silt loam that has brown mottles and 25 percent rock fragments

Substratum:
43 to 60 inches, reddish brown very gravelly loam that has 35 percent rock fragments

Inclusions.—Included with this soil in mapping are small areas of the well drained Lewbeach and moderately well drained Willowemoc soils on the higher or more sloping parts of the landscape. Also included are the poorly drained and very poorly drained Suny soils in drainageways and seepy areas and areas that have stones and boulders on the surface. Included areas are as much as 3 acres each in size and make up about 15 to 25 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and the upper part of the subsoil and slow or very slow in the fragipan and the substratum
Available water capacity: Moderate
Soil reaction: Very strongly acid to slightly acid above the fragipan and very strongly acid to moderately acid in and below the fragipan
Depth to the seasonal high water table: 6 inches to 1.5 feet (November through April)

Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Slow or medium
Erosion hazard: Slight

Use.—Most areas of this soil are used for cultivated crops or pasture. Some areas are used as woodland.

Crops and pasture.—This soil is moderately suited to cultivated crops. Wetness is the main limitation. A subsurface drainage system will reduce the wetness. A conservation tillage system that leaves crop residue on the surface after planting will reduce the hazard of erosion. Properly managing crop residue and adding organic material will help to maintain tilth.

This soil is well suited to pasture. Deferment of grazing during wet periods will help to keep the pasture in good condition. Pasture rotation, proper stocking rates, applications of fertilizer, and weed control will increase forage yields.

Woodland.—The potential productivity of this soil for red maple is moderate. Seasonal wetness causes seedling mortality and windthrow and limits the use of equipment.

Dwellings.—Wetness is the main limitation. Grading so that surface water moves away from the dwellings, installing interceptor drains that divert water from the higher adjacent areas, installing drains around footings and foundations, and sealing the foundations will reduce the wetness.

Local roads and streets.—Wetness and the potential for frost action are the main limitations. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action. Raised fill material and a drainage system will reduce the wetness.

Septic tank absorption fields.—Wetness and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept runoff from the higher adjacent areas. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which effluent is absorbed.

Capability classification.—IIIw

OnC—Onteora silt loam, 8 to 15 percent slopes. This soil is very deep, strongly sloping, and somewhat poorly drained. It is on glaciated hills and valley sides at the higher elevations in the Catskill Mountains. It formed in glacial till derived from reddish shale, sandstone, and siltstone. Slopes are smooth and convex. Areas are irregular in shape and range from 5 to 120 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 9 inches, dark reddish brown silt loam that has 10 percent rock fragments

Subsoil:
- 9 to 14 inches, reddish brown gravelly loam that has dark yellowish brown and light brown mottles
- 14 to 25 inches, a fragipan of reddish brown, very firm and brittle gravelly silt loam that has brownish yellow mottles and 25 percent rock fragments
- 25 to 43 inches, a fragipan of dark reddish brown, very firm and brittle gravelly silt loam that has brown mottles and 25 percent rock fragments

Substratum:
- 43 to 60 inches, reddish brown very gravelly loam that has 35 percent rock fragments

Inclusions.—Included with this soil in mapping are small areas of the well drained Lewbeach and moderately well drained Willowemoc soils on the higher or more sloping parts of the landscape. Also included are the poorly drained and very poorly drained Suny soils in drainageways and seepy areas and areas that have stones and boulders on the surface. Included areas are as much as 3 acres each in size and make up about 15 to 20 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and the upper part of the subsoil and slow or very slow in the fragipan and the substratum
Available water capacity: Moderate
Soil reaction: Very strongly acid to slightly acid above the fragipan and very strongly acid to moderately acid in and below the fragipan
Depth to the seasonal high water table: 6 inches to 1.5 feet (November through April)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Medium
Erosion hazard: Moderate

Use.—Most areas of this soil are used for cultivated crops or pasture. Some areas are used as woodland.

Crops and pasture.—This soil is moderately suited to cultivated crops. Wetness and the erosion hazard are the main management concerns. A subsurface drainage system will reduce the wetness. Contour farming or stripcropping and a conservation tillage system that leaves crop residue on the surface after planting will reduce the hazard of erosion. Properly managing crop

residue and adding organic material will help to maintain tilth.

This soil is well suited to pasture. Deferment of grazing during wet periods will help to keep the pasture in good condition. Pasture rotation, proper stocking rates, applications of fertilizer, and weed control will increase forage yields.

Woodland.—The potential productivity of this soil for red maple is moderate. Seasonal wetness causes seedling mortality and windthrow and limits the use of equipment.

Dwellings.—Wetness is the main limitation. Grading so that surface water moves away from the dwellings, installing interceptor drains that divert water from the higher adjacent areas, installing drains around footings and foundations, and sealing the foundations will reduce the wetness. Maintaining the plant cover during construction and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—Wetness and the potential for frost action are the main limitations. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action. Raised fill material and a drainage system will reduce the wetness.

Septic tank absorption fields.—Wetness and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept runoff from the higher adjacent areas. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which effluent is absorbed.

Capability classification.—IIIe

OoC—Onteora silt loam, 3 to 15 percent slopes, very stony. This soil is very deep, gently sloping to strongly sloping, and somewhat poorly drained. It is on glaciated hills and valley sides at the higher elevations in the Catskill Mountains. It formed in glacial till derived from reddish shale, sandstone, and siltstone. Stones that are 10 to 24 inches in diameter cover as much as 3 percent of the surface. Slopes are smooth and convex. Areas are irregular in shape and range from 5 to 120 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 9 inches, dark reddish brown silt loam that has 10 percent rock fragments

Subsoil:

9 to 14 inches, reddish brown gravelly loam that has dark yellowish brown and light brown mottles

14 to 25 inches, a fragipan of reddish brown, very firm and brittle gravelly silt loam that has brownish yellow mottles and 25 percent rock fragments

25 to 43 inches, a fragipan of dark reddish brown, very firm and brittle gravelly silt loam that has brown mottles and 25 percent rock fragments

Substratum:

43 to 60 inches, reddish brown very gravelly loam that has 35 percent rock fragments

Inclusions.—Included with this soil in mapping are small areas of the well drained Lewbeach and moderately well drained Willowemoc soils on the higher or more sloping parts of the landscape. Also included are the poorly drained and very poorly drained Suny soils in drainageways and seepy areas, areas that have no stones or boulders on the surface, and eroded areas. Included areas are as much as 3 acres each in size and make up about 15 to 20 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and the upper part of the subsoil and slow or very slow in the fragipan and the substratum
Available water capacity: Moderate
Soil reaction: Very strongly acid to slightly acid above the fragipan and very strongly acid to moderately acid in and below the fragipan
Depth to the seasonal high water table: 6 inches to 1.5 feet (November through April)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Medium
Erosion hazard: Moderate

Use.—Most areas of this soil are used as woodland. Some areas are used as pasture.

Crops and pasture.—This soil is generally unsuited to cultivated crops and poorly suited to pasture. The stones on the surface are the main limitation. Wetness and the erosion hazard also are management concerns. Deferment of grazing during wet periods will help to keep the pasture in good condition. Pasture rotation, proper stocking rates, applications of fertilizer, and weed control will increase forage yields.

Woodland.—The potential productivity of this soil for red maple is moderate. Seasonal wetness causes seedling mortality and windthrow and limits the use of equipment.

Dwellings.—Wetness is the main limitation. Grading so that surface water moves away from the dwellings, installing interceptor drains that divert water from the higher adjacent areas, installing drains around footings

and foundations, and sealing the foundations will reduce the wetness. Maintaining the plant cover during construction and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—Wetness and the potential for frost action are the main limitations. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action. Raised fill material and a drainage system will reduce the wetness.

Septic tank absorption fields.—Wetness and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept runoff from the higher adjacent areas. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which effluent is absorbed.

Capability classification.—VIs

OpC—Onteora silt loam, rolling, very bouldery. This soil is very deep and somewhat poorly drained. It is on hills and in valleys in the Catskill Mountains. It formed in glacial till derived from reddish shale, sandstone, and siltstone. Boulders that are 24 to 48 inches in diameter cover as much as 3 percent of the surface. Slopes range from 5 to 15 percent. Areas are irregular in shape and range from 5 to 100 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 9 inches, dark reddish brown silt loam that has 10 percent rock fragments

Subsoil:
- 9 to 14 inches, reddish brown gravelly loam that has dark yellowish brown and light brown mottles
- 14 to 25 inches, a fragipan of reddish brown, very firm and brittle gravelly silt loam that has brownish yellow mottles and 25 percent rock fragments
- 25 to 43 inches, a fragipan of dark reddish brown, very firm and brittle gravelly silt loam that has brown mottles and 25 percent rock fragments

Substratum:
- 43 to 60 inches, reddish brown very gravelly loam that has 35 percent rock fragments

Inclusions.—Included with this soil in mapping are small areas of the well drained Lewbeach and moderately well drained Willowemoc soils on the higher or more sloping parts of the landscape. Also included are the poorly drained and very poorly drained Suny soils in drainageways and seepy areas and areas that have no stones or boulders on the surface. Included areas are as much as 3 acres each in size and make up about 15 to 25 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and the upper part of the subsoil and slow or very slow in the fragipan and the substratum
Available water capacity: Moderate
Soil reaction: Very strongly acid to slightly acid above the fragipan and very strongly acid to moderately acid in and below the fragipan
Depth to the seasonal high water table: 6 inches to 1.5 feet (November through April)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Medium
Erosion hazard: Moderate

Use.—Most areas of this soil are used as woodland.

Crops and pasture.—This soil is generally unsuited to cultivated crops and poorly suited to pasture. The boulders on the surface are the main limitation. Wetness and the erosion hazard also are management concerns. Deferment of grazing during wet periods will help to keep the pasture in good condition. Pasture rotation, proper stocking rates, applications of fertilizer, and weed control will increase forage yields.

Woodland.—The potential productivity of this soil for red maple is moderate. Seasonal wetness causes seedling mortality and windthrow and limits the use of equipment.

Dwellings.—Wetness is the main limitation. Grading so that surface water moves away from the dwellings, installing interceptor drains that divert water from the higher adjacent areas, installing drains around footings and foundations, and sealing the foundations will reduce the wetness. Maintaining the plant cover during construction and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—Wetness and the potential for frost action are the main limitations. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action. Raised fill material and a drainage system will reduce the wetness.

Septic tank absorption fields.—Wetness and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept runoff from the higher adjacent areas. Enlarging the absorption fields or the trenches below

the distribution lines will increase the rate at which effluent is absorbed.

Capability classification.—VIs

OrB—Oquaga very channery silt loam, 3 to 8 percent slopes. This soil is moderately deep, gently sloping, and somewhat excessively drained and well drained. It is on the smooth parts of bedrock-controlled landforms. It formed in glacial till derived from sandstone and shale. Slopes are mainly convex but in some areas are irregular. Areas are irregular in shape and range from 5 to 40 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
 0 to 8 inches, dark brown very channery silt loam that has 35 percent rock fragments

Subsoil:
 8 to 15 inches, reddish brown very channery silt loam that has 40 percent rock fragments
 15 to 22 inches, yellowish red very channery silt loam that has 40 percent rock fragments

Bedrock:
 22 inches, red and gray, massive sandstone

Inclusions.—Included with this soil in mapping are areas of the shallow Arnot and Tuller soils on the sides of ridges. Soils that are similar to the Oquaga soil but are deeper to bedrock are included on the top of some ridges. Also included are areas of Lackawanna and Wellsboro soils on the top of some ridges, areas where bedrock is exposed, and areas where the surface is eroded. Included areas are as much as 5 acres each in size and make up about 25 percent of the unit.

Major soil properties—

Permeability: Moderate throughout the profile
Available water capacity: Low
Soil reaction: Extremely acid to moderately acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 20 to 40 inches
Surface runoff: Medium
Erosion hazard: Slight

Use.—Most areas of this soil are used for hay or pasture. A few areas are used for cultivated crops or woodland.

Crops and pasture.—This soil is well suited to cultivated crops. A conservation tillage system that leaves crop residue on the surface after planting will help to control erosion. Properly managing crop residue and adding other organic material will help to maintain tilth.

This soil is well suited to pasture. Rotation grazing, proper stocking rates, weed control, and applications of fertilizer will increase forage yields.

Woodland.—The potential productivity of this soil for sugar maple is moderate. Few or no limitations affect woodland management.

Dwellings.—The depth to bedrock is the main limitation, especially on sites for dwellings with basements. Building above the bedrock and adding fill as needed will help to overcome this limitation.

Local roads and streets.—The depth to bedrock and the potential for frost action are the main limitations. Planning road locations and grades so that rock removal is not needed will help to overcome the depth to bedrock. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action.

Septic tank absorption fields.—The depth to bedrock is the main limitation. A poor filtering capacity is a limitation, and contamination of the ground water is a hazard.

Capability classification.—IIe

OrC—Oquaga very channery silt loam, 8 to 15 percent slopes. This soil is moderately deep, strongly sloping, and somewhat excessively drained and well drained. It is on the top and sides of bedrock-controlled landforms. It formed in glacial till derived from sandstone and shale. Slopes are mainly convex but in some areas are irregular. Areas are irregular in shape and range from 5 to 20 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
 0 to 8 inches, dark brown very channery silt loam that has 35 percent rock fragments

Subsoil:
 8 to 15 inches, reddish brown very channery silt loam that has 40 percent rock fragments
 15 to 22 inches, yellowish red very channery silt loam that has 40 percent rock fragments

Bedrock:
 22 inches, red and gray, massive sandstone

Inclusions.—Included with this soil in mapping are areas of the shallow Arnot and Tuller soils on the sides of ridges. Soils that are similar to the Oquaga soil but are deeper to bedrock are included on the top of some ridges. Also included are areas of Lackawanna and Wellsboro soils on the top of some ridges, areas where bedrock is exposed, and areas where the surface is eroded. Included areas are as much as 5 acres each in

size and make up about 20 percent of the unit.

Major soil properties—

Permeability: Moderate throughout the profile
Available water capacity: Low
Soil reaction: Extremely acid to moderately acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 20 to 40 inches
Surface runoff: Medium
Erosion hazard: Moderate

Use.—Most areas of this soil are used for hay or pasture. A few areas are used for cultivated crops or woodland.

Crops and pasture.—This soil is moderately suited to cultivated crops. Erosion is the main hazard. Contour farming and stripcropping and a conservation tillage system that leaves crop residue on the surface after planting will help to control erosion. Properly managing crop residue and adding other organic material will help to maintain tilth.

This soil is well suited to pasture. Rotation grazing, proper stocking rates, weed control, and applications of fertilizer will increase forage yields.

Woodland.—The potential productivity of this soil for sugar maple is moderate. Few or no limitations affect woodland management.

Dwellings.—The depth to bedrock is the main limitation, especially on sites for dwellings with basements. Building above the bedrock and adding fill as needed will help to overcome this limitation. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—The depth to bedrock and the potential for frost action are the main limitations. Planning road locations and grades so that rock removal is not needed will help to overcome the depth to bedrock. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action.

Septic tank absorption fields.—The depth to bedrock is the main limitation. A poor filtering capacity is a limitation, and contamination of the ground water is a hazard.

Capability classification.—IIIe

OrD—Oquaga very channery silt loam, 15 to 25 percent slopes. This soil is moderately deep, moderately steep, and somewhat excessively drained and well drained. It is on the top and sides of bedrock-controlled landforms. It formed in glacial till derived from sandstone and shale. Slopes are mainly convex but in some areas are irregular. Areas are irregular in shape and range from 5 to 40 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, dark brown very channery silt loam that has 35 percent rock fragments
Subsoil:
8 to 15 inches, reddish brown very channery silt loam that has 40 percent rock fragments
15 to 22 inches, yellowish red very channery silt loam that has 40 percent rock fragments
Bedrock:
22 inches, red and gray, massive sandstone

Inclusions.—Included with this soil in mapping are areas of the shallow Arnot and Tuller soils on the sides of ridges. Soils that are similar to the Oquaga soil but are deeper to bedrock are included on the top of some ridges. Also included are areas of Lackawanna and Wellsboro soils on the top of some ridges, areas where bedrock is exposed, and areas where the surface is eroded. Included areas are as much as 5 acres each in size and make up about 15 percent of the unit.

Major soil properties—

Permeability: Moderate throughout the profile
Available water capacity: Low
Soil reaction: Extremely acid to moderately acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 20 to 40 inches
Surface runoff: Rapid
Erosion hazard: Severe

Use.—Most areas of this soil are used as woodland. A few areas are used for hay or pasture.

Crops and pasture.—This soil is poorly suited to cultivated crops. Erosion is the main hazard. Contour farming or stripcropping, a crop rotation dominated by close-growing crops, and a conservation tillage system that leaves crop residue on the surface after planting will help to control erosion. Properly managing crop residue and adding other organic material will help to maintain tilth.

This soil is moderately suited to pasture. Rotation grazing, proper stocking rates, weed control, and applications of fertilizer will increase forage yields.

Woodland.—The potential productivity of this soil for sugar maple is moderate. The slope limits the use of equipment.

Dwellings.—The depth to bedrock and the slope are the main limitations, especially on sites for dwellings

with basements. Building above the bedrock and adding fill as needed will help to overcome the depth to bedrock. Special design will help to overcome the slope. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—The slope is the main limitation. Special design will help to overcome this limitation.

Septic tank absorption fields.—The depth to bedrock and the slope are the main limitations. A poor filtering capacity is a limitation, and contamination of the ground water is a hazard.

Capability classification.—IVe

OsC—Oquaga-Arnot complex, 3 to 15 percent slopes, very rocky. This unit consists of gently sloping to strongly sloping soils on the top and sides of hills and plateaus in bedrock-controlled areas in the foothills of the Catskill Mountains. The Oquaga soil is on the upper parts of the slopes, and the Arnot soil is on the lower parts. These soils formed in glacial till derived from sandstone and shale. Areas are long and narrow or irregular in shape and range from 5 to 200 acres in size. They are about 50 percent moderately deep, well drained and somewhat excessively drained Oquaga soil; 25 percent shallow, somewhat excessively drained to moderately well drained Arnot soil; and 25 percent other soils and rock outcrop. The rock outcrop covers about 2 to 10 percent of the surface. The soils in the unit occur in such an intricate pattern that it was not practical to map them separately.

The typical sequence, depth, and composition of the layers of the Oquaga soil are as follows—

Surface layer:
0 to 8 inches, dark brown channery silt loam that has 35 percent rock fragments

Subsoil:
8 to 15 inches, reddish brown very channery silt loam that has 40 percent rock fragments
15 to 22 inches, yellowish red very channery silt loam that has 40 percent rock fragments

Bedrock:
22 inches, red and gray, massive sandstone

The typical sequence, depth, and composition of the layers of the Arnot soil are as follows—

Surface layer:
0 to 1 inch, dark reddish brown channery silt loam that has 34 percent rock fragments

Subsoil:
1 to 12 inches, reddish brown very channery silt loam that has 55 percent rock fragments

Bedrock:
12 inches, weak red, fractured sandstone

Inclusions.—Included in this unit in mapping are areas of the shallow Tuller soils on the sides of ridges. Soils that are similar to the Oquaga soil but are very deep to bedrock are included on the top of some ridges. Also included are areas of Lackawanna and Wellsboro soils on the top of some ridges and areas where the surface is eroded. Included areas are as much as 5 acres each in size.

Major properties of the Oquaga soil—

Permeability: Moderate throughout the profile
Available water capacity: Low
Soil reaction: Extremely acid to moderately acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 20 to 40 inches
Surface runoff: Medium
Erosion hazard: Moderate

Major properties of the Arnot soil—

Permeability: Moderate throughout the profile
Available water capacity: Very low
Soil reaction: Extremely acid to moderately acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 10 to 20 inches
Surface runoff: Medium
Erosion hazard: Moderate

Use.—Most of the acreage in this unit is woodland. A few areas are used as vacation sites or sites for homes.

Crops and pasture.—This unit is generally unsuited to cultivated crops and poorly suited to pasture. The erosion hazard, the depth to bedrock, the rock outcrops, and the very low available water capacity are the major limitations.

Woodland.—The potential productivity is moderate for sugar maple on the Oquaga soil and for northern red oak on the Arnot soil. Few or no limitations affect woodland management.

Dwellings.—The depth to bedrock, especially in the Arnot soil, is the main limitation. Constructing above the bedrock and adding fill as needed will help to overcome this limitation. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—The depth to bedrock in the Arnot soil is the main limitation. The slope, the potential

for frost action, and the depth to bedrock in the Oquaga soil are additional limitations. Planning road locations and grades so that rock removal is not needed will help to overcome the depth to bedrock in the Oquaga soil. A coarse grained subgrade will reduce the potential for frost action. Special design will help to overcome the slope.

Septic tank absorption fields.—The depth to bedrock is the major limitation. A poor filtering capacity is a limitation, and contamination of the ground water is a hazard.

Capability classification.—VIs

OsD—Oquaga-Arnot complex, 15 to 35 percent slopes, very rocky. This unit consists of moderately steep soils on the top and sides of hills, valleys, and plateaus in bedrock-controlled areas in the foothills of the Catskill Mountains. The Oquaga soil is on the upper parts of the slopes, and the Arnot soil is on the lower parts. These soils formed in glacial till derived from sandstone and shale. Areas are long and narrow or irregular in shape and range from 5 to 275 acres in size. They are about 40 percent moderately deep, well drained and somewhat excessively drained Oquaga soil; 35 percent shallow, somewhat excessively drained to moderately well drained Arnot soil; and 25 percent other soils and rock outcrop. The rock outcrop covers about 2 to 10 percent of the surface. The soils in the unit occur in such an intricate pattern that it was not practical to map them separately.

The typical sequence, depth, and composition of the layers of the Oquaga soil are as follows—

Surface layer:
- 0 to 8 inches, dark brown channery silt loam that has 35 percent rock fragments

Subsoil:
- 8 to 15 inches, reddish brown very channery silt loam that has 40 percent rock fragments
- 15 to 22 inches, yellowish red very channery silt loam that has 40 percent rock fragments

Bedrock:
- 22 inches, red and gray, massive sandstone

The typical sequence, depth, and composition of the layers of the Arnot soil are as follows—

Surface layer:
- 0 to 1 inch, dark reddish brown channery silt loam that has 34 percent rock fragments

Subsoil:
- 1 to 12 inches, reddish brown very channery silt loam that has 55 percent rock fragments

Bedrock:
- 12 inches, weak red, fractured sandstone

Inclusions.—Included in this unit in mapping are areas of the shallow Tuller soils on the sides of ridges. Soils that are similar to the Oquaga soil but are very deep to bedrock are included on the top of some ridges. Also included are areas of Lackawanna and Wellsboro soils on the top of some ridges and areas where the surface is eroded. Included areas are as much as 5 acres each in size.

Major properties of the Oquaga soil—

Permeability: Moderate throughout the profile
Available water capacity: Low
Soil reaction: Extremely acid to moderately acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 20 to 40 inches
Surface runoff: Rapid
Erosion hazard: Severe

Major properties of the Arnot soil—

Permeability: Moderate throughout the profile
Available water capacity: Very low
Soil reaction: Extremely acid to moderately acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 10 to 20 inches
Surface runoff: Rapid
Erosion hazard: Severe

Use.—Most of the acreage in this unit is woodland. A few areas are used as vacation sites or sites for homes.

Crops and pasture.—This unit is generally unsuited to cultivated crops and poorly suited to pasture. The erosion hazard, the depth to bedrock, the rock outcrops, and the very low available water capacity are the major limitations.

Woodland.—The potential productivity is moderate for sugar maple on the Oquaga soil and for northern red oak on the Arnot soil. The slope limits the use of equipment.

Dwellings.—The depth to bedrock, especially in the Arnot soil, and the slope are the main limitations. Constructing above the bedrock and adding fill as needed will help to overcome the depth to bedrock. Special design will help to overcome the slope. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—The depth to bedrock in the Arnot soil and the slope of both soils are the main

limitations. The potential for frost action and the depth to bedrock in the Oquaga soil are additional limitations. Planning road locations and grades so that rock removal is not needed will help to overcome the depth to bedrock in the Oquaga soil. A coarse grained subgrade will reduce the potential for frost action. Special design will help to overcome the slope.

Septic tank absorption fields.—The depth to bedrock and the slope are the major limitations. A poor filtering capacity is a limitation, and contamination of the ground water is a hazard.

Capability classification.—VIIs

OsF—Oquaga-Arnot complex, 35 to 55 percent slopes, very rocky. This unit consists of very steep soils on the top and sides of hills, valleys, and plateaus in bedrock-controlled areas in the foothills of the Catskill Mountains. The Oquaga soil is on the upper parts of the slopes, and the Arnot soil is on the lower parts. These soils formed in glacial till derived from sandstone and shale. Areas are long and narrow or irregular in shape and range from 5 to 150 acres in size. They are about 50 percent moderately deep, well drained and somewhat excessively drained Oquaga soil; 30 percent shallow, somewhat excessively drained to moderately well drained Arnot soil; and 20 percent other soils and rock outcrop. The rock outcrop covers about 2 to 10 percent of the surface. The soils in the unit occur in such an intricate pattern that it was not practical to map them separately.

The typical sequence, depth, and composition of the layers of the Oquaga soil are as follows—

Surface layer:
- 0 to 8 inches, dark brown channery silt loam that has 35 percent rock fragments

Subsoil:
- 8 to 15 inches, reddish brown very channery silt loam that has 40 percent rock fragments
- 15 to 22 inches, yellowish red very channery silt loam that has 40 percent rock fragments

Bedrock:
- 22 inches, red and gray, massive sandstone

The typical sequence, depth, and composition of the layers of the Arnot soil are as follows—

Surface layer:
- 0 to 1 inch, dark reddish brown channery silt loam that has 34 percent rock fragments

Subsoil:
- 1 to 12 inches, reddish brown very channery silt loam that has 55 percent rock fragments

Bedrock:
- 12 inches, weak red, fractured sandstone

Inclusions.—Included in this unit in mapping are areas of the shallow Tuller soils on the sides of ridges. Soils that are similar to the Oquaga soil but are very deep to bedrock are included on the top of some ridges. Also included are areas of Lackawanna and Wellsboro soils on the top of some ridges and areas where the surface is eroded. Included areas are as much as 5 acres each in size.

Major properties of the Oquaga soil—

Permeability: Moderate throughout the profile
Available water capacity: Low
Soil reaction: Extremely acid to moderately acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 20 to 40 inches
Surface runoff: Very rapid
Erosion hazard: Very severe

Major properties of the Arnot soil—

Permeability: Moderate throughout the profile
Available water capacity: Very low
Soil reaction: Extremely acid to moderately acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 10 to 20 inches
Surface runoff: Very rapid
Erosion hazard: Very severe

Use.—Most of the acreage in this unit is woodland.

Crops and pasture.—This unit is generally unsuited to cultivated crops and pasture. The erosion hazard, the depth to bedrock, the rock outcrops, and the very low available water capacity are the major limitations.

Woodland.—The potential productivity is moderate for sugar maple on the Oquaga soil and for northern red oak on the Arnot soil. The slope limits the use of equipment.

Dwellings.—The depth to bedrock, especially in the Arnot soil, and the slope are the main limitations.

Local roads and streets.—The depth to bedrock in the Arnot soil and the slope of both soils are the main limitations. The potential for frost action and the depth to bedrock in the Oquaga soil are additional limitations. Planning road locations and grades so that rock removal is not needed will help to overcome the depth to bedrock in the Oquaga soil. A coarse grained subgrade will reduce the potential for frost action. Special design will help to overcome the slope.

Septic tank absorption fields.—The depth to bedrock and the slope are the major limitations. A poor filtering capacity, side-slope seepage of effluent, and

contamination of the ground water are management concerns.

Capability classification.—VIIs

Pg—Pits, gravel. This unit consists of areas that have been excavated for sand or gravel used in construction projects. These excavations are dominantly in areas of glacial outwash but also are in areas of loose, sandy glacial till. The pits are 3 to 50 feet deep and have steep sides and a nearly level bottom. Stones and boulders are common on the pit floor. Areas are generally irregular in shape or rectangular and range from 5 to 80 acres in size.

Inclusions.—Included in this unit in mapping are small areas where bedrock is at the surface. Also included are small piles of loamy, silty, or clayey material on some pit floors; some areas where the gravel pits have small pools of water; and partially reclaimed areas where salvaged topsoil has been replaced.

Major soil properties.—Permeability varies in this unit but generally is moderately rapid to very rapid. Available water capacity is very low, and the unit generally is droughty. Reaction generally is extremely acid to strongly acid.

Use and suitability.—Onsite evaluation is needed to determine the suitability of this unit for any use. Because of the very low moisture levels and a high proportion of gravel and cobblestones, the unit is generally unsuitable for cultivated crops and pasture. It has limited suitability for most urban uses. Because of droughtiness, establishing vegetation is difficult. Pollution of the ground water is a hazard on sites for septic tank absorption fields.

Capability classification.—None

Pr—Pits, quarry. This unit consists of areas where sandstone, shale, or limestone has been mined or quarried from original bedrock formations. These quarries have exposed bedrock that is mainly level in the western part of the county and folded in the eastern part. The pits vary in shape and range from 5 to 200 acres in size.

Inclusions.—Arnot, Oquaga, and Lordstown soils are in the adjoining areas where sandstone, siltstone, and shale are dominant. Nassau soils are dominant in areas of shale, graywacke, and slate. Farmington and Galway soils are in areas where limestone bedrock is dominant.

Use and suitability.—This unit is generally unsuitable for cultivated crops and pasture because of a limited depth to bedrock and a very low available water capacity in some areas. Woodland productivity is poor because of the limited depth to bedrock and the quarry rubble. Community development and other nonfarm uses are severely limited by the shallowness to bedrock and the quarry rock debris.

Capability classification.—None

RhA—Riverhead loam, 0 to 3 percent slopes. This soil is very deep, nearly level, and well drained. It is on beach ridges along the shoreline of glacial Lake Albany. It formed in sandy and gravelly outwash. Slopes are mainly smooth and convex. Areas are long and narrow and range from 5 to 100 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, dark brown loam
Subsoil:
8 to 15 inches, dark yellowish brown fine sandy loam
15 to 24 inches, dark yellowish brown sandy loam
Substratum:
24 to 60 inches, brown loamy sand

Inclusions.—Included with this soil in mapping are small areas of the moderately well drained Elmridge soils and the somewhat poorly drained Shaker soils. Also included are the well drained and somewhat excessively drained Chenango soils, the moderately well drained Hudson soils, and soils that have bedrock within a depth of 60 inches. Included areas are as much as 5 acres each in size and make up about 25 percent of the unit.

Major soil properties—

Permeability: Moderately rapid in the surface layer and subsoil and very rapid below the subsoil
Available water capacity: Moderate
Soil reaction: Very strongly acid to moderately acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Slow
Erosion hazard: Slight

Use.—Most areas are used for hay or pasture. A few areas are used for cultivated crops, and a few have been developed for urban uses. This soil is classified as prime farmland.

Crops and pasture.—This soil is well suited to cultivated crops. The available water capacity is the main limitation. A conservation tillage system that leaves crop residue on the surface after planting will reduce the hazard of erosion. Properly managing crop residue and adding other organic material will conserve

soil moisture. Irrigation systems function well on this soil and are often used in areas where vegetable crops are grown.

This soil is well suited to pasture. Erosion is a hazard if the pasture is overgrazed. Deferment of grazing during droughty periods will help to keep the pasture in good condition. Rotation grazing, proper stocking rates, applications of fertilizer, and weed control will increase forage yields.

Woodland.—The potential productivity of this soil for sugar maple is moderate.

Dwellings.—Few or no limitations affect the use of this soil as a site for dwellings.

Local roads and streets.—The potential for frost action is the main limitation. A coarse grained subgrade to frost depth will reduce the potential for frost action.

Septic tank absorption fields.—A poor filtering capacity is the main limitation, and contamination of the ground water is a hazard.

Capability classification.—IIs

RhB—Riverhead loam, 3 to 8 percent slopes. This soil is very deep, gently sloping, and well drained. It is on beach ridges along the shoreline of glacial Lake Albany. It formed in sandy and gravelly outwash. Slopes are mainly smooth and convex. Areas are long and narrow and range from 5 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, dark brown loam
Subsoil:
8 to 15 inches, dark yellowish brown fine sandy loam
15 to 24 inches, dark yellowish brown sandy loam
Substratum:
24 to 60 inches, brown loamy sand

Inclusions.—Included with this soil in mapping are small areas of the moderately well drained Elmridge soils and the somewhat poorly drained Shaker soils. Also included are the well drained and somewhat excessively drained Chenango soils, the moderately well drained Hudson soils, and soils that have bedrock within a depth of 60 inches. Included areas are as much as 5 acres each in size and make up about 15 percent of the unit.

Major soil properties—

Permeability: Moderately rapid in the surface layer and subsoil and very rapid below the subsoil
Available water capacity: Moderate
Soil reaction: Very strongly acid to moderately acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Medium
Erosion hazard: Slight

Use.—Most areas are used for hay or pasture. A few areas are used for cultivated crops, and a few have been developed for urban uses. This soil is classified as prime farmland.

Crops and pasture.—This soil is well suited to cultivated crops. The available water capacity is the main limitation. A conservation tillage system that leaves crop residue on the surface after planting will reduce the hazard of erosion. Properly managing crop residue and adding other organic material will conserve soil moisture. Irrigation systems function well on this soil and are often used in areas where vegetable crops are grown.

This soil is well suited to pasture. Erosion is a hazard if the pasture is overgrazed. Deferment of grazing during droughty periods will help to keep the pasture in good condition. Rotation grazing, proper stocking rates, applications of fertilizer, and weed control will increase forage yields.

Woodland.—The potential productivity of this soil for sugar maple is moderate.

Dwellings.—Few or no limitations affect the use of this soil as a site for dwellings.

Local roads and streets.—The potential for frost action is the main limitation. A coarse grained subgrade to frost depth will reduce the potential for frost action.

Septic tank absorption fields.—A poor filtering capacity is the main limitation, and contamination of the ground water is a hazard.

Capability classification.—IIs

RhC—Riverhead loam, rolling. This soil is very deep and well drained. It is on beach ridges along the shoreline of glacial Lake Albany. It formed in sandy and gravelly outwash. Slopes are mainly smooth and convex and range from 5 to 15 percent. Areas are long and narrow and range from 5 to 100 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, dark brown loam
Subsoil:
8 to 15 inches, dark yellowish brown fine sandy loam
15 to 24 inches, dark yellowish brown sandy loam
Substratum:
24 to 60 inches, brown loamy sand

Inclusions.—Included with this soil in mapping are small areas of the moderately well drained Elmridge soils and the somewhat poorly drained Shaker soils. Also included are the well drained and somewhat excessively drained Chenango soils, the moderately well drained Hudson soils, and soils that have bedrock within a depth of 60 inches. Included areas are as much as 5 acres each in size and make up about 15 percent of the unit.

Major soil properties—

Permeability: Moderately rapid in the surface layer and subsoil and very rapid below the subsoil
Available water capacity: Moderate
Soil reaction: Very strongly acid to moderately acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Medium
Erosion hazard: Moderate

Use.—Most areas of this soil are used for hay or pasture. A few areas are used for cultivated crops.

Crops and pasture.—This soil is moderately suited to cultivated crops. The available water capacity and the erosion hazard are the main management concerns. A conservation tillage system that leaves crop residue on the surface after planting, contour farming, and stripcropping or terracing will reduce the hazard of erosion. Properly managing crop residue and adding other organic material will conserve soil moisture.

This soil is well suited to pasture. Erosion is a hazard if the pasture is overgrazed. Deferment of grazing during droughty periods will help to keep the pasture in good condition. Rotation grazing, proper stocking rates, applications of fertilizer, and weed control will increase forage yields.

Woodland.—The potential productivity of this soil for sugar maple is moderate.

Dwellings.—The slope is the main limitation. Special design will help to overcome this limitation. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—The potential for frost action and the slope are the main limitations. A coarse grained subgrade to frost depth will reduce the potential for frost action. Building the roads on the contour will help to overcome the slope.

Septic tank absorption fields.—A poor filtering capacity is the main limitation, and contamination of the ground water is a hazard.

Capability classification.—IIIe

RhD—Riverhead loam, hilly. This soil is very deep and well drained. It is on beach ridges along the shoreline of glacial Lake Albany. It formed in sandy and gravelly outwash. Slopes are mainly smooth and convex and range from 15 to 25 percent. Areas are long and narrow and range from 5 to 100 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, dark brown loam
Subsoil:
8 to 15 inches, dark yellowish brown fine sandy loam
15 to 24 inches, dark yellowish brown sandy loam
Substratum:
24 to 60 inches, brown loamy sand

Inclusions.—Included with this soil in mapping are small areas of the moderately well drained Elmridge soils and the somewhat poorly drained Shaker soils. Also included are the well drained and somewhat excessively drained Chenango soils, the moderately well drained Hudson soils, and soils that have bedrock within a depth of 60 inches. Included areas are as much as 5 acres each in size and make up about 20 percent of the unit.

Major soil properties—

Permeability: Moderately rapid in the surface layer and subsoil and very rapid below the subsoil
Available water capacity: Moderate
Soil reaction: Very strongly acid to moderately acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Rapid
Erosion hazard: Severe

Use.—Most areas of this soil are used as woodland. A few areas are used as pasture.

Crops and pasture.—This soil is poorly suited to cultivated crops. Erosion is the main hazard, and the slope limits the use of equipment. A conservation tillage system that leaves crop residue on the surface after planting, contour farming or stripcropping, and a crop rotation dominated by close-growing crops will reduce the hazard of erosion.

This soil is moderately suited to pasture. Erosion is a hazard if the pasture is overgrazed. Deferment of grazing during droughty periods will help to keep the pasture in good condition. Rotation grazing, proper stocking rates, applications of fertilizer, and weed control will increase forage yields.

Woodland.—The potential productivity of this soil for sugar maple is moderate. The slope limits the use of equipment.

Dwellings.—The slope is the main limitation. Special design and grading and filling will help to overcome this limitation. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—The slope is the main limitation. Special design and grading and land shaping will help to overcome this limitation.

Septic tank absorption fields.—A poor filtering capacity is the main limitation, and contamination of the ground water is a hazard.

Capability classification.—IVe

Sh—Shaker very fine sandy loam. This soil is very deep, nearly level, and somewhat poorly drained. It is on lake plains in the eastern part of the county. It formed in loamy sediments and the underlying clayey lake deposits. Slopes range from 0 to 3 percent. Areas are broad and irregular in shape and range from 5 to 20 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, dark grayish brown very fine sandy loam

Subsurface layer:
8 to 16 inches, light brownish gray fine sandy loam that has brownish yellow mottles

Subsoil:
16 to 20 inches, yellowish brown fine sandy loam that has olive gray mottles
20 to 31 inches, grayish brown silty clay loam that has yellowish brown mottles

Substratum:
31 to 60 inches, olive gray silty clay that has yellowish brown mottles

Inclusions.—Included with this soil in mapping are small areas of the moderately well drained Elmridge soils on the slightly higher parts of the landscape. Also included are Rhinebeck soils and soils that are similar to the Shaker soil but are deeper to the underlying clayey sediments. Included areas are as much as 3 acres each in size and make up 15 to 25 percent of the unit.

Major soil properties—

Permeability: Moderately rapid in the surface layer and the upper part of the subsoil and slow or very slow in the lower part of the subsoil and in the substratum
Available water capacity: High
Soil reaction: Strongly acid to slightly acid in the surface layer and the upper part of the subsoil and moderately acid to neutral in the lower part of the subsoil and in the substratum
Depth to the seasonal high water table: 0 to 1.5 feet (November through May)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Slow
Erosion hazard: None

Use.—Most areas are used as permanent pasture. A few areas are used for cultivated crops or woodland. This soil is classified as prime farmland.

Crops and pasture.—This soil is moderately suited to cultivated crops. Wetness is the main limitation. It interferes with planting and harvesting during years of high rainfall. A combination of surface ditches and subsurface drains will reduce the wetness.

This soil is well suited to pasture. A drainage system is needed for optimum yields. Deferment of grazing during wet periods, proper stocking rates, rotation grazing, and weed control will increase forage yields.

Woodland.—The potential productivity of this soil for eastern white pine is high. Wetness limits the use of equipment and causes seedling mortality and windthrow.

Dwellings.—Seasonal wetness is the main limitation, especially on sites for dwellings with basements. Grading and installing interceptor drains that divert runoff from the higher adjacent areas will reduce the wetness. Installing foundation drains and backfilling with sand and gravel also will reduce the wetness.

Local roads and streets.—Wetness and the potential for frost action are the main limitations. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action. Raised fill material and a drainage system will reduce the wetness.

Septic tank absorption fields.—Wetness and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept runoff from the higher adjacent areas. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which effluent is absorbed.

Capability classification.—IIIw

Su—Suny gravelly silt loam, very stony. This soil is very deep, nearly level, and poorly drained and very poorly drained. It is in depressions, seepy areas, and plane areas on till plains. It formed in reddish glacial till derived from sandstone and shale. Stones as much as

24 inches in diameter cover as much as 3 percent of the surface. Slopes range from 0 to 3 percent. Areas are broad and irregular in shape and range from 5 to 25 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 8 inches, dark reddish brown gravelly silt loam that has 15 percent rock fragments

Subsoil:
- 8 to 15 inches, dark gray loam that has gray and strong brown mottles and 10 percent rock fragments
- 15 to 19 inches, reddish brown gravelly loam that has reddish brown mottles and 20 percent rock fragments

Substratum:
- 19 to 63 inches, reddish brown gravelly loam that has 30 percent rock fragments

Inclusions.—Included with this soil in mapping are small areas of the somewhat poorly drained Onteora soils on the higher parts of the landscape and small areas of Carlisle muck in the lower depressions. Also included are small areas of the shallow Tor soils and areas that are extremely stony or bouldery. Included areas are as much as 3 acres each in size and make up about 15 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and slow below the surface layer
Available water capacity: Moderate
Soil reaction: Extremely acid to strongly acid throughout the profile
Depth to the seasonal high water table: 0 to 6 inches (November through April)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Slow
Erosion hazard: None

Use.—Most areas of this soil are wooded or support marsh vegetation. A few areas are used as unimproved pasture.

Crops and pasture.—This soil is generally unsuited to cultivated crops and pasture because of surface stoniness and wetness.

Woodland.—The potential productivity of this soil for hemlock is moderately high. Wetness limits the use of equipment and causes seedling mortality and windthrow.

Dwellings.—Wetness is the main limitation.

Local roads and streets.—Wetness and the potential for frost action are the main limitations. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action. Raised fill material and a drainage system will reduce the wetness.

Septic tank absorption fields.—Wetness is the main limitation. A poor filtering capacity is a limitation, and contamination of the ground water is a hazard.

Capability classification.—VIIs

Ta—Tioga loam. This soil is very deep, nearly level, and well drained. It is on flood plains. It formed in recently deposited alluvial sediments. Slopes range from 0 to 3 percent. Areas are irregular in shape and range from 5 to 120 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 10 inches, dark brown loam

Subsoil:
- 10 to 20 inches, brown fine sandy loam
- 20 to 26 inches, dark grayish brown fine sandy loam
- 26 to 34 inches, brown fine sandy loam

Substratum:
- 34 to 40 inches, dark brown loamy fine sand
- 40 to 44 inches, brown fine sandy loam
- 44 to 48 inches, brown gravelly sandy loam
- 48 to 60 inches, brown, stratified gravel and loamy sand

Inclusions.—Included with this soil in mapping are small areas of the somewhat poorly drained Middlebury and poorly drained and very poorly drained Wayland soils on the lower parts of the flood plains. Also included are small areas of the gravelly Chenango soils on outwash terraces. Included areas are as much as 3 acres each in size and make up about 15 percent of the unit.

Major soil properties—

Permeability: Moderate or moderately rapid in the surface layer and subsoil and moderate to rapid in the substratum
Available water capacity: High
Soil reaction: Strongly acid to neutral in the surface layer and subsoil and moderately acid to mildly alkaline in the substratum
Depth to the seasonal high water table: 3 to 6 feet (February through April)
Flooding: Occasional and brief (November through May)
Depth to bedrock: More than 60 inches
Surface runoff: Slow
Erosion hazard: None or slight

Use.—Most areas are used for cultivated crops. A few areas are wooded. This soil is classified as prime farmland.

Crops and pasture.—This soil is well suited to cultivated crops. Flooding generally does not occur during the growing season. It results in a network of small channels and adjacent areas of debris. Periodic land grading is needed to clear the debris and shape the channels. Properly managing crop residue and regularly adding other organic material will help to maintain good tilth and conserve soil moisture.

Woodland.—The potential productivity of this soil for northern red oak is moderately high.

Dwellings.—Flooding is the main hazard.

Local roads and streets.—Flooding is the main hazard. Raised fill material will reduce this hazard.

Septic tank absorption fields.—Wetness and flooding are the main management concerns. A poor filtering capacity is a limitation, and contamination of the water supply is probable, especially during periods of flooding.

Capability classification.—I

To—Tor flaggy loam. This soil is shallow, nearly level, and somewhat poorly drained and poorly drained. It is at high elevations on the plane parts of bedrock-controlled hills and mountains. It formed in glacial till and is underlain by sandstone. Slopes range from 0 to 3 percent. Areas are broad or long and narrow and range from 5 to 100 acres in size.

Typically, the surface is covered by 2 inches of organic material. The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 5 inches, dark brown flaggy loam that has 25 percent rock fragments

Subsoil:
- 5 to 17 inches, dark reddish gray flaggy loam that has dark brown mottles and 50 percent rock fragments

Substratum:
- 17 to 19 inches, dark reddish gray very flaggy loam that has 50 percent rock fragments

Bedrock:
- 19 inches, red and olive, fractured, massive sandstone

Inclusions.—Included with this soil in mapping are small areas of the somewhat excessively drained to moderately well drained Halcott soils and the well drained and somewhat excessively drained Vly soils. These soils are in the higher areas. Also included are small areas of soils that are similar to the Tor soil but are less than 10 inches or more than 20 inches deep to bedrock or have fewer rock fragments. Included areas are as much as 3 acres each in size and make up about 15 to 25 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and slow or moderately slow in the subsoil and substratum
Available water capacity: Very low
Soil reaction: Strongly acid to extremely acid throughout the profile
Depth to the seasonal high water table: 6 inches to 1 foot (December through June)
Flooding: None
Depth to bedrock: 10 to 20 inches
Surface runoff: Slow
Erosion hazard: None or slight

Use.—Most areas of this soil are used as woodland. A few areas are used as pasture.

Crops and pasture.—This soil is poorly suited to cultivated crops because of wetness. Stones on the surface limit tillage, and the depth to bedrock is a limitation. Removal of the stones can facilitate tillage in some areas. Improving drainage is difficult because the soil generally is in the lowest areas on the landscape, where suitable outlets are not available. The shallowness to bedrock hinders the installation of drainage systems. Properly managing crop residue and adding other organic material will increase the supply of available moisture.

This soil is moderately suited to pasture. Wetness is the main limitation. A drainage system is needed for optimum yields. Deferment of grazing during wet periods, proper stocking rates, and weed control will increase forage yields.

Woodland.—The potential productivity of this soil for red maple is moderate. Wetness and the stones limit the use of equipment. The available water capacity and the wetness cause seedling mortality. Bedrock and the water table limit the rooting depth, causing a windthrow hazard.

Dwellings.—Wetness and the depth to bedrock are the main limitations on sites for dwellings, especially those with basements. The bedrock cannot be easily ripped. Building above bedrock and adding fill as needed will help to overcome the depth to bedrock. Installing subsurface drains around the foundations and backfilling with sand and gravel will reduce the wetness.

Local roads and streets.—Wetness and the depth to bedrock are the main limitations. Graded, raised fill material will minimize these limitations.

Septic tank absorption fields.—Wetness and the depth to bedrock are the main limitations. A poor filtering

capacity is a limitation, and contamination of the ground water is a hazard.

Capability classification.—IVw

Tr—Tor flaggy loam, very bouldery. This soil is shallow, nearly level, and somewhat poorly drained. It is at high elevations on the plane parts of bedrock-controlled hills and mountains. It formed in glacial till and is underlain by sandstone. Slopes range from 0 to 3 percent. Areas are irregular in shape and range from 5 to 100 acres in size.

Typically, the surface is covered by 2 inches of organic material. The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 5 inches, dark brown flaggy loam that has 25 percent rock fragments

Subsoil:
5 to 17 inches, dark reddish gray flaggy loam that has dark brown mottles and 50 percent rock fragments

Substratum:
17 to 19 inches, dark reddish gray very flaggy loam that has 50 percent rock fragments

Bedrock:
19 inches, red and olive, fractured, massive sandstone

Inclusions.—Included with this soil in mapping are small areas of the somewhat excessively drained to moderately well drained Halcott and well drained and somewhat excessively drained Vly soils on the higher parts of the landscape. Also included are small areas of Willowemoc and Lewbeach soils and small areas of soils that are similar to the Tor soil but are less than 10 inches or more than 20 inches deep to bedrock. Included areas are as much as 3 acres each in size and make up about 15 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and slow or moderately slow in the subsoil and substratum
Available water capacity: Very low
Soil reaction: Strongly acid to extremely acid throughout the profile
Depth to the seasonal high water table: 6 inches to 1 foot (December through June)
Flooding: None
Depth to bedrock: 10 to 20 inches
Surface runoff: Slow
Erosion hazard: None or slight

Use.—Most of the acreage of this soil is remote woodland.

Crops and pasture.—This soil is generally unsuited to cultivated crops and poorly suited to pasture because of wetness and stones and boulders on the surface. Deferment of grazing during wet periods, proper stocking rates, rotation grazing, and weed control will increase forage yields.

Woodland.—The potential productivity of this soil for red maple is moderate. Wetness and the stones and boulders limit the use of equipment. The available water capacity and the wetness cause seedling mortality. Bedrock and the water table limit the rooting depth, causing a windthrow hazard.

Dwellings.—Wetness and the depth to bedrock are the main limitations on sites for dwellings, especially those with basements. The bedrock cannot be easily ripped. Building above bedrock and adding fill as needed will help to overcome the depth to bedrock. Installing subsurface drains around the foundations and backfilling with sand and gravel will reduce the wetness.

Local roads and streets.—Wetness and the depth to bedrock are the main limitations. Graded, raised fill material will minimize these limitations.

Septic tank absorption fields.—Wetness and the depth to bedrock are the main limitations. A poor filtering capacity is a limitation, and contamination of the ground water is a hazard.

Capability classification.—IVw

Ts—Tuller channery silt loam. This soil is shallow, nearly level, and somewhat poorly drained and poorly drained. It is in depressional areas on bedrock-controlled till plains. It formed in glacial till derived from sandstone and shale. Slopes range from 0 to 3 percent. Areas are broad and irregular in shape and range from 5 to 100 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 9 inches, very dark grayish brown channery silt loam

Subsoil:
9 to 14 inches, dark grayish brown channery silt loam

Bedrock:
14 inches, gray, massive sandstone

Inclusions.—Included with this soil in mapping are small areas of the shallow, moderately well drained to somewhat excessively drained Arnot soils and the moderately deep Lordstown and Oquaga soils. Also included are areas of soils that are similar to the Tuller soil but are less than 10 inches deep to bedrock or have more than 35 percent rock fragments. Included areas are as much as 3 acres each in size and make

up about 15 to 25 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and slow or moderately slow in the subsoil
Available water capacity: Very low
Soil reaction: Very strongly acid to moderately acid throughout the profile
Depth to the seasonal high water table: 6 inches to 1 foot (December through June)
Flooding: None
Depth to bedrock: 10 to 20 inches
Surface runoff: Slow
Erosion hazard: None or slight

Use.—Most areas of this soil are used as woodland. A few areas are used as pasture.

Crops and pasture.—This soil is poorly suited to cultivated crops and pasture. The depth to bedrock, the low available water capacity, and seasonal wetness are the main limitations. Improving drainage is difficult because the soil generally is in low areas, where suitable outlets are not available. Properly managing crop residue and adding other organic material will increase the moisture supply.

Woodland.—The potential productivity of this soil for red maple is moderate. Wetness limits the use of equipment. The wetness and the available water capacity cause seedling mortality. The wetness and the depth to bedrock limit the rooting depth, causing a windthrow hazard.

Dwellings.—Wetness and the depth to bedrock are the main limitations on sites for dwellings, especially those with basements. The bedrock is massive sandstone that cannot be easily ripped. Building above the bedrock and adding fill as needed will help to overcome the depth to bedrock. The wetness can be reduced by installing subsurface drains around the foundations and backfilling with sand and gravel.

Local roads and streets.—Wetness and the depth to bedrock are the main limitations. Graded, raised fill material will minimize these limitations.

Septic tank absorption fields.—The depth to bedrock and the wetness are the main limitations. A poor filtering capacity is a limitation, and contamination of the ground water is a hazard.

Capability classification.—IVw

Tt—Tuller channery silt loam, very stony. This soil is shallow, nearly level, and somewhat poorly drained and poorly drained. It is in depressional areas on bedrock-controlled till plains. It formed in glacial till derived from sandstone and shale. Stones as much as 10 inches in diameter cover less than 1 percent to 3 percent of the surface. Slopes range from 0 to 3 percent. Areas are broad and irregular in shape and range from 5 to 125 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 9 inches, very dark grayish brown channery silt loam
Subsoil:
9 to 14 inches, dark grayish brown channery silt loam
Bedrock:
14 inches, gray, massive sandstone

Inclusions.—Included with this soil in mapping are small areas of the shallow, moderately well drained to somewhat excessively drained Arnot soils and the moderately deep Lordstown and Oquaga soils. Also included are areas of soils that are similar to the Tuller soil but are less than 10 inches deep to bedrock or have more than 35 percent rock fragments. Included areas are as much as 3 acres each in size and make up about 15 to 25 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and slow or moderately slow in the subsoil
Available water capacity: Very low
Soil reaction: Very strongly acid to moderately acid throughout the profile
Depth to the seasonal high water table: 6 inches to 1 foot (December through June)
Flooding: None
Depth to bedrock: 10 to 20 inches
Surface runoff: Slow
Erosion hazard: None or slight

Use.—Most areas of this soil are used as woodland. A few areas are used as pasture.

Crops and pasture.—This soil is generally unsuited to cultivated crops and pasture because of the stones on the surface. The depth to bedrock, the low available water capacity, and seasonal wetness also are limitations.

Woodland.—The potential productivity of this soil for red maple is moderate. Wetness and the stones on the surface limit the use of equipment. The wetness and the available water capacity cause seedling mortality. The wetness and the depth to bedrock limit the rooting depth, causing a windthrow hazard.

Dwellings.—Wetness and the depth to bedrock are the main limitations on sites for dwellings, especially those with basements. The bedrock is massive sandstone that cannot be easily ripped. Building above

the bedrock and adding fill as needed will help to overcome the depth to bedrock. The wetness can be reduced by installing subsurface drains around the foundations and backfilling with sand and gravel.

Local roads and streets.—Wetness and the depth to bedrock are the main limitations. Graded, raised fill material will minimize these limitations.

Septic tank absorption fields.—The depth to bedrock and the wetness are the main limitations. A poor filtering capacity is a limitation, and contamination of the ground water is a hazard.

Capability classification.—VIIs

TuA—Tunkhannock gravelly loam, 0 to 3 percent slopes. This soil is very deep, nearly level, and somewhat excessively drained and well drained. It is on the plane parts of outwash plains and terraces. It formed in stratified sand and gravel. Areas are broad or irregular in shape and range from 3 to 75 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 7 inches, dark brown gravelly loam that has 25 percent rock fragments

Subsoil:
- 7 to 13 inches, reddish brown very gravelly loam that has 35 percent rock fragments
- 13 to 19 inches, brown very gravelly loam that has 40 percent rock fragments
- 19 to 25 inches, reddish brown very gravelly loam that has 55 percent rock fragments

Substratum:
- 25 to 60 inches, brown, stratified extremely gravelly sand that has 70 percent rock fragments

Inclusions.—Included with this soil in mapping are small areas of the well drained Barbour and moderately well drained Basher soils on flood plains, Fluvaquents and Udifluvents adjacent to streams, the well drained Valois and Lackawanna soils on uplands, and the moderately deep Oquaga soils on bedrock-controlled uplands. Included areas are as much as 5 acres each in size and make up 15 to 25 percent of the unit.

Major soil properties—

Permeability: Moderately rapid in the surface layer and subsoil and very rapid in the substratum
Available water capacity: Low
Soil reaction: Extremely acid to moderately acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Slow
Erosion hazard: None or slight

Use.—Most areas are used for cultivated crops, hay, or pasture. Some areas are used as woodland or support brush. Some are used as building sites. This soil is classified as prime farmland.

Crops and pasture.—This soil is well suited to cultivated crops. The available water capacity is the main limitation. A conservation tillage system that leaves crop residue on the surface after planting will reduce the hazard of erosion. Properly managing crop residue and adding other organic material will conserve soil moisture. Irrigation systems function well on this soil and often are used in areas where vegetable crops are grown.

Woodland.—The potential productivity of this soil for northern red oak is moderately high.

Dwellings.—Large stones throughout the soil limit excavation. They are the main limitation.

Local roads and streets.—The large stones are the main limitation.

Septic tank absorption fields.—A poor filtering capacity is the main limitation, and contamination of the ground water is a hazard.

Capability classification.—IIs

TuB—Tunkhannock gravelly loam, 3 to 8 percent slopes. This soil is very deep, gently sloping, and somewhat excessively drained and well drained. It is on the sides of terraces and on the convex parts of outwash plains. It formed in stratified sand and gravel. Areas are broad or irregular in shape and range from 5 to 100 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 7 inches, dark brown gravelly loam that has 25 percent rock fragments

Subsoil:
- 7 to 13 inches, reddish brown very gravelly loam that has 35 percent rock fragments
- 13 to 19 inches, brown very gravelly loam that has 40 percent rock fragments
- 19 to 25 inches, reddish brown very gravelly loam that has 55 percent rock fragments

Substratum:
- 25 to 60 inches, brown, stratified extremely gravelly sand that has 70 percent rock fragments

Inclusions.—Included with this soil in mapping are small areas of the well drained Barbour and moderately well drained Basher soils on flood plains, Fluvaquents and Udifluvents adjacent to streams, the well drained

Valois and Lackawanna soils on uplands, and the moderately deep Oquaga soils on bedrock-controlled uplands. Included areas are as much as 5 acres each in size and make up 15 to 25 percent of the unit.

Major soil properties—

Permeability: Moderately rapid in the surface layer and subsoil and very rapid in the substratum
Available water capacity: Low
Soil reaction: Extremely acid to moderately acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Medium
Erosion hazard: Slight

Use.—Most areas are used for cultivated crops, hay, or pasture. Some areas are used as woodland or support brush. Some are used as building sites. This soil is classified as prime farmland.

Crops and pasture.—This soil is well suited to cultivated crops. The available water capacity is the main limitation. A conservation tillage system that leaves crop residue on the surface after planting will reduce the hazard of erosion. Properly managing crop residue and adding other organic material will conserve soil moisture. Irrigation systems function well on this soil and often are used in areas where vegetable crops are grown.

Woodland.—The potential productivity of this soil for northern red oak is moderately high.

Dwellings.—Large stones throughout the soil limit excavation. They are the main limitation.

Local roads and streets.—The large stones are the main limitation.

Septic tank absorption fields.—A poor filtering capacity is the main limitation, and contamination of the ground water is a hazard.

Capability classification.—IIs

TuC—Tunkhannock gravelly loam, rolling. This soil is very deep and is somewhat excessively drained and well drained. It is on the top and sides of kames and terraces. It formed in stratified sand and gravel. Slopes are complex and irregular. They range from 5 to 16 percent. Areas are broad or irregular in shape and range from 5 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 7 inches, dark brown gravelly loam that has 25 percent rock fragments

Subsoil:
7 to 13 inches, reddish brown very gravelly loam that has 35 percent rock fragments
13 to 19 inches, brown very gravelly loam that has 40 percent rock fragments
19 to 25 inches, reddish brown very gravelly loam that has 55 percent rock fragments

Substratum:
25 to 60 inches, brown, stratified extremely gravelly sand that has 70 percent rock fragments

Inclusions.—Included with this soil in mapping are small areas of the well drained Barbour and moderately well drained Basher soils on flood plains, Fluvaquents and Udifluvents adjacent to streams, the well drained Valois and Lackawanna soils on uplands, and the moderately deep Oquaga soils on bedrock-controlled uplands. Included areas are as much as 5 acres each in size and make up 10 to 25 percent of the unit.

Major soil properties—

Permeability: Moderately rapid in the surface layer and subsoil and very rapid in the substratum
Available water capacity: Low
Soil reaction: Extremely acid to moderately acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Medium
Erosion hazard: Moderate

Use.—Most areas of this soil are used for hay or pasture or support brush. Some areas are used for cultivated crops or woodland.

Crops and pasture.—This soil is moderately suited to cultivated crops. The erosion hazard and the available water capacity are the main management concerns. A conservation tillage system that leaves crop residue on the surface after planting, contour farming, and stripcropping or terracing will reduce the hazard of erosion. Properly managing crop residue and adding other organic material will conserve soil moisture.

Woodland.—The potential productivity of this soil for northern red oak is moderately high.

Dwellings.—The slope and large stones throughout the soil are the main limitations. The stones limit excavation. Special design will help to overcome the slope. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—The slope and the large stones are the main limitations. Land shaping or grading and special design will help to overcome the slope.

Septic tank absorption fields.—A poor filtering capacity is the main limitation, and contamination of the ground water is a hazard.

Capability classification.—IIIe

TuD—Tunkhannock gravelly loam, hilly. This soil is very deep and is somewhat excessively drained and well drained. It is on kames, eskers, and the sides of valleys. It formed in stratified sand and gravel. Slopes are complex and irregular. They range from 10 to 30 percent. Areas are broad or irregular in shape and range from 5 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 7 inches, dark brown gravelly loam that has 25 percent rock fragments

Subsoil:

7 to 13 inches, reddish brown very gravelly loam that has 35 percent rock fragments

13 to 19 inches, brown very gravelly loam that has 40 percent rock fragments

19 to 25 inches, reddish brown very gravelly loam that has 55 percent rock fragments

Substratum:

25 to 60 inches, brown, stratified extremely gravelly sand that has 70 percent rock fragments

Inclusions.—Included with this soil in mapping are small areas of the well drained Barbour and moderately well drained Basher soils on flood plains, Fluvaquents and Udifluvents adjacent to streams, the well drained Valois and Lackawanna soils on uplands, and the moderately deep Oquaga soils on bedrock-controlled uplands. Included areas are as much as 5 acres each in size and make up 10 to 25 percent of the unit.

Major soil properties—

Permeability: Moderately rapid in the surface layer and subsoil and very rapid in the substratum

Available water capacity: Low

Soil reaction: Extremely acid to moderately acid throughout the profile

Depth to the seasonal high water table: More than 6 feet

Flooding: None

Depth to bedrock: More than 60 inches

Surface runoff: Rapid

Erosion hazard: Severe

Use.—Most areas of this soil support brush or are used as woodland. Some areas are used as permanent pasture.

Crops and pasture.—This soil is poorly suited to cultivated crops. Erosion is the main hazard. The slope limits the use of equipment. A conservation tillage system that leaves crop residue on the surface after planting, contour farming, stripcropping, and a crop rotation dominated by close-growing crops will reduce the hazard of erosion.

This soil is moderately suited to pasture. Controlled grazing, rotation grazing, weed control, and proper stocking rates will increase forage yields.

Woodland.—The potential productivity of this soil for northern red oak is moderately high. The slope limits the use of equipment.

Dwellings.—The slope and large stones throughout the soil are the main limitations. The stones limit excavation. Special design will help to overcome the slope. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—The slope and the large stones are the main limitations. Land shaping or grading and special design will help to overcome the slope.

Septic tank absorption fields.—A poor filtering capacity is the main limitation, and contamination of the ground water is a hazard.

Capability classification.—IVe

TvB—Tunkhannock gravelly loam, fan, 3 to 8 percent slopes. This soil is very deep and is somewhat excessively drained and well drained. It is in areas at the base of hills where sediment accumulates. It formed in stratified sand and gravel. Areas are broad or irregular in shape and range from 5 to 150 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 7 inches, dark brown gravelly loam that has 25 percent rock fragments

Subsoil:

7 to 13 inches, reddish brown very gravelly loam that has 35 percent rock fragments

13 to 19 inches, brown very gravelly loam that has 40 percent rock fragments

19 to 25 inches, reddish brown very gravelly loam that has 55 percent rock fragments

Substratum:

25 to 60 inches, brown, stratified extremely gravelly sand that has 70 percent rock fragments

Inclusions.—Included with this soil in mapping are small areas of the well drained Barbour and moderately well drained Basher soils on flood plains, Fluvaquents and Udifluvents adjacent to streams, the well drained Valois and Lackawanna soils on uplands, and the

moderately deep Oquaga soils on bedrock-controlled uplands. Included areas are as much as 5 acres each in size and make up 20 to 25 percent of the unit.

Major soil properties—

Permeability: Moderately rapid in the surface layer and subsoil and very rapid in the substratum
Available water capacity: Low
Soil reaction: Extremely acid to moderately acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Slow
Erosion hazard: Slight

Use.—Most areas are used for cultivated crops, hay, or pasture. Some areas are used as woodland or support brush. This soil is classified as prime farmland.

Crops and pasture.—This soil is well suited to cultivated crops. The available water capacity is the main limitation. A conservation tillage system that leaves crop residue on the surface after planting will reduce the hazard of erosion. Properly managing crop residue and adding other organic material will conserve soil moisture. Irrigation systems function well on this soil and often are used in areas where vegetable crops are grown.

Woodland.—The potential productivity of this soil for northern red oak is moderately high.

Dwellings.—Large stones throughout the soil limit excavation. They are the main limitation.

Local roads and streets.—The large stones are the main limitation.

Septic tank absorption fields.—A poor filtering capacity is the main limitation, and contamination of the ground water is a hazard.

Capability classification.—IIs

TwE—Tunkhannock and Chenango gravelly loams, 25 to 45 percent slopes. This unit consists of somewhat excessively drained and well drained, very deep, steep and very steep soils on terrace escarpments and the sides of kames. The soils formed in stratified sand and gravel. Slopes are mainly short, and many are irregular, especially on kames. Areas are long and narrow and range from 5 to 30 acres in size. The total acreage of the unit is about 50 percent Tunkhannock soil, 30 percent Chenango soil, and 20 percent other soils. Some areas consist mainly of Tunkhannock soil, some mainly of Chenango soil, and some of both soils. The soils were mapped together because they are used and managed in similar ways.

The typical sequence, depth, and composition of the layers of the Tunkhannock soil are as follows—

Surface layer:
0 to 7 inches, dark brown gravelly loam that has 25 percent rock fragments
Subsoil:
7 to 13 inches, reddish brown very gravelly loam that has 35 percent rock fragments
13 to 19 inches, brown very gravelly loam that has 40 percent rock fragments
19 to 25 inches, reddish brown very gravelly loam that has 55 percent rock fragments
Substratum:
25 to 60 inches, brown, stratified extremely gravelly sand that has 70 percent rock fragments

The typical sequence, depth, and composition of the layers of the Chenango soil are as follows—

Surface layer:
0 to 4 inches, dark brown gravelly loam that has 25 percent rock fragments
Subsoil:
4 to 11 inches, brown gravelly loam that has 30 percent rock fragments
11 to 26 inches, dark brown very gravelly loam that has 45 percent rock fragments
Substratum:
26 to 34 inches, dark brown very gravelly loamy sand that has 60 percent rock fragments
34 to 60 inches, dark brown, stratified sand and gravel having 65 percent rock fragments

Inclusions.—Included in this unit in mapping are small areas of soils that are underlain by clay within a depth of 40 inches. Also included are soils that are shallow to bedrock, Riverhead soils, and Valois soils on valley slopes and walls. Included areas are as much as 3 acres each in size.

Major properties of the Tunkhannock soil—

Permeability: Moderately rapid in the surface layer and subsoil and rapid in the substratum
Available water capacity: Low
Soil reaction: Extremely acid to moderately acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Very rapid
Erosion hazard: Very severe

Major properties of the Chenango soil—

Permeability: Moderate or moderately rapid in the surface layer and subsoil and rapid in the substratum

Available water capacity: Low
Soil reaction: Very strongly acid or strongly acid in the surface layer, very strongly acid to moderately acid in the subsoil, and strongly acid to mildly alkaline in the substratum
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Very rapid
Erosion hazard: Very severe

Use.—Most areas of this unit are wooded. A few areas are used as pasture or support brush.

Crops and pasture.—This unit is generally unsuited to cultivated crops and pasture. The hazard of erosion and the slope are the main management concerns.

Woodland.—The potential productivity is moderately high for northern red oak on the Tunkhannock soil and for sugar maple on the Chenango soil. Erosion is a hazard. The slope limits the use of equipment.

Dwellings.—Large stones in the soils and the slope are the main limitations.

Local roads and streets.—The large stones and the slope are the main limitations. Land shaping and grading will help to overcome the slope.

Septic tank absorption fields.—A poor filtering capacity and the slope are the main limitations. Contamination of the ground water is a hazard.

Capability classification.—VIIe

Ud—Udipsamments, dredged. This unit consists of dredgings from the bed of the Hudson River. Areas are long and narrow and range from 5 to 50 acres in size.

Typically, the surface layer is dark grayish brown sand about 5 inches thick. The substratum to a depth of 60 inches or more is pale brown sand.

Inclusions.—Included in this unit in mapping are small areas of the poorly drained and very poorly drained Wayland and moderately well drained and somewhat poorly drained Middlebury soils. These soils commonly have dredged material on the surface. Also included are areas of the shallow Nassau soils. Included areas are as much as 3 acres each in size and make up about 15 percent of the unit.

Major soil properties.—Permeability is rapid or very rapid throughout the profile. Available water capacity is very low. Surface runoff is very slow. Depth to the underlying original soil is generally more than 60 inches. Depth to the high water table is generally more than 60 inches but is determined in most places by tides.

Use and suitability.—Most areas are forested or support brush. This unit is not suited to farming. The soils are dry most of the year, particularly during the growing season. The potential productivity of this unit for trees is low. The dry conditions cause a high seedling mortality rate. Onsite evaluation is needed to determine the suitability of the unit for most other uses.

Capability classification.—None

Ur—Udorthents, loamy. This unit consists of very deep, level to gently sloping, well drained and moderately well drained, loamy soils in areas on uplands that have been cut and filled. Slopes range from 0 to 8 percent. Areas are roughly rectangular and range from 3 to 25 acres in size.

Typically, the surface layer is dark brown silt loam about 5 inches thick. The underlying layers extend to a depth of more than 60 inches. They are brown and yellowish brown silt loam and loam having as much as 40 percent rock fragments.

Inclusions.— Included in this unit in mapping are areas filled with rock fragments and deeply buried rubbish and a few areas where the fill consists of building trash, cinders, coal ash, and other kinds of solid waste. Also included are small areas of soils that have not been covered by fill material. Included areas are as much as 3 acres each in size and make up about 20 percent of the unit.

Major soil properties.—The properties of this unit vary greatly from place to place. In many areas the soils have properties similar to those of the adjacent soils.

Suitability.—The suitability of this unit for any use ranges from poor to good. Onsite investigation is needed to determine the suitability of any site.

Capability classification.—None

VaB—Valois gravelly loam, 3 to 8 percent slopes. This soil is very deep, gently sloping, and well drained. It is on the plane parts of foothills and till plains. It formed in glacial till derived from sandstone and shale. Areas are broad and irregular in shape and range from 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, dark brown gravelly loam that has 15 percent rock fragments
Subsoil:
8 to 14 inches, dark yellowish brown gravelly loam that has 15 percent rock fragments
14 to 34 inches, olive brown gravelly loam that has 30 percent rock fragments
Substratum:
34 to 60 inches, olive brown gravelly silt loam that has 30 percent rock fragments

Inclusions.—Included with this soil in mapping are

areas of the more gravelly Chenango and Tunkhannock soils, the moderately deep Lordstown and Oquaga soils, and the moderately well drained Nunda and somewhat poorly drained Burdett soils on ridgetops. Also included are areas that have stones and boulders on the surface and areas that are eroded. Included areas are as much as 3 acres each in size and make up 10 to 15 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and subsoil and moderately rapid in the substratum
Available water capacity: Moderate
Soil reaction: Extremely acid to moderately acid in the surface layer and subsoil and very strongly acid to neutral in the substratum
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Medium
Erosion hazard: Slight

Use.—Most areas are used as hayland or pasture. A few areas are used for cultivated crops or woodland. This soil is classified as prime farmland.

Crops and pasture.—This soil is well suited to cultivated crops. A conservation tillage system that leaves crop residue on the surface after planting will help to control erosion. Properly managing crop residue and adding other organic material will help to maintain good tilth.

This soil is well suited to pasture. Rotation grazing, proper stocking rates, weed control, and applications of fertilizer will increase forage yields.

Woodland.—The potential productivity of this soil for sugar maple is moderate.

Dwellings.—This soil is generally suitable as a site for dwellings.

Local roads and streets.—The potential for frost action is the main limitation. A coarse grained subgrade to frost depth will reduce the potential for frost action.

Septic tank absorption fields.—The restricted permeability is the main limitation. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which effluent is absorbed.

Capability classification.—IIe

VaC—Valois gravelly loam, rolling. This soil is very deep and well drained. It is on valley walls and foothills. It formed in glacial till derived from sandstone and shale. Slopes are irregular and range from 8 to 15 percent. Areas are broad and irregular in shape and range from 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, dark brown gravelly loam that has 15 percent rock fragments
Subsoil:
8 to 14 inches, dark yellowish brown gravelly loam that has 15 percent rock fragments
14 to 34 inches, olive brown gravelly loam that has 30 percent rock fragments
Substratum:
34 to 60 inches, olive brown gravelly silt loam that has 30 percent rock fragments

Inclusions.—Included with this soil in mapping are areas of the more gravelly Chenango and Tunkhannock soils, the moderately deep Lordstown and Oquaga soils, and the moderately well drained Nunda and somewhat poorly drained Burdett soils on ridgetops. Also included are areas that have stones and boulders on the surface and areas that are eroded. Included areas are as much as 3 acres each in size and make up 20 to 25 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and subsoil and moderately rapid in the substratum
Available water capacity: Moderate
Soil reaction: Extremely acid to moderately acid in the surface layer and subsoil and very strongly acid to neutral in the substratum
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Medium
Erosion hazard: Moderate

Use.—Most areas of this soil are used as hayland or pasture. A few areas are used for cultivated crops or woodland.

Crops and pasture.—This soil is moderately suited to cultivated crops. A conservation tillage system that leaves crop residue on the surface after planting and contour farming or stripcropping will help to control erosion. Properly managing crop residue and adding other organic material will help to maintain good tilth.

This soil is well suited to pasture. Rotation grazing, proper stocking rates, weed control, and applications of fertilizer will increase forage yields.

Woodland.—The potential productivity of this soil for sugar maple is moderate.

Dwellings.—The slope is the main limitation. Special design helps to overcome this limitation. Maintaining the

plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—The potential for frost action and the slope are the main limitations. A coarse grained subgrade to frost depth will reduce the potential for frost action. Constructing the roads on the contour will help to overcome the slope.

Septic tank absorption fields.—The restricted permeability and the slope are the main limitations. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which effluent is absorbed. Installing the distribution lines on the contour and providing distribution boxes or other structures that ensure even distribution of the effluent will increase the efficiency of the system.

Capability classification.—IIIe

VaD—Valois gravelly loam, 15 to 25 percent slopes. This soil is very deep, moderately steep, and well drained. It is on valley walls and foothills. It formed in glacial till derived from sandstone and shale. Areas are broad and irregular in shape and range from 5 to 150 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 8 inches, dark brown gravelly loam that has 15 percent rock fragments

Subsoil:
- 8 to 14 inches, dark yellowish brown gravelly loam that has 15 percent rock fragments
- 14 to 34 inches, olive brown gravelly loam that has 30 percent rock fragments

Substratum:
- 34 to 60 inches, olive brown gravelly silt loam that has 30 percent rock fragments

Inclusions.—Included with this soil in mapping are areas of the more gravelly Chenango and Tunkhannock soils, the moderately deep Lordstown and Oquaga soils, and the moderately well drained Nunda and somewhat poorly drained Burdett soils on ridgetops. Also included are areas that have stones and boulders on the surface and areas that are eroded. Included areas are as much as 3 acres each in size and make up 10 to 15 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and subsoil and moderately rapid in the substratum
Available water capacity: Moderate
Soil reaction: Extremely acid to moderately acid in the surface layer and subsoil and very strongly acid to neutral in the substratum
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Rapid
Erosion hazard: Severe

Use.—Most areas of this soil are used as woodland. A few areas are used as pasture.

Crops and pasture.—This soil is poorly suited to cultivated crops. The slope and the erosion hazard are the major management concerns. A conservation tillage system that leaves crop residue on the surface after planting, contour farming or stripcropping, and a crop rotation dominated by close-growing crops will help to control erosion. Properly managing crop residue and adding other organic material will help to maintain good tilth.

This soil is moderately suited to pasture. Rotation grazing, proper stocking rates, weed control, and applications of fertilizer will reduce the hazard of erosion.

Woodland.—The potential productivity of this soil for sugar maple is moderate. The slope limits the use of equipment.

Dwellings.—The slope is the main limitation. Special design helps to overcome this limitation. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—The slope is the main limitation. Constructing the roads on the contour and land shaping or grading will help to overcome this limitation.

Septic tank absorption fields.—The restricted permeability and the slope are the main limitations. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which effluent is absorbed. Installing the distribution lines on the contour and providing distribution boxes or other structures that ensure even distribution of the effluent will increase the efficiency of the system.

Capability classification.—IVe

VaF—Valois gravelly loam, 25 to 60 percent slopes. This soil is very deep, steep and very steep, and well drained. It is on valley walls and foothills. It formed in glacial till derived from sandstone and shale. Areas are broad and irregular in shape and range from 5 to 75 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, dark brown gravelly loam that has 15 percent rock fragments
Subsoil:
8 to 14 inches, dark yellowish brown gravelly loam that has 15 percent rock fragments
14 to 34 inches, olive brown gravelly loam that has 30 percent rock fragments
Substratum:
34 to 60 inches, olive brown gravelly silt loam that has 30 percent rock fragments

Inclusions.—Included with this soil in mapping are areas of the more gravelly Chenango and Tunkhannock soils, the moderately deep Lordstown and Oquaga soils, and the moderately well drained Nunda and somewhat poorly drained Burdett soils on ridgetops. Also included are areas that have stones and boulders on the surface and areas that are eroded. Included areas are as much as 3 acres each in size and make up 10 to 15 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and subsoil and moderately rapid in the substratum
Available water capacity: Moderate
Soil reaction: Extremely acid to moderately acid in the surface layer and subsoil and very strongly acid to neutral in the substratum
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Very rapid
Erosion hazard: Very severe

Use.—Most areas of this soil are used as woodland.

Crops and pasture.—This soil is generally unsuited to cultivated crops and poorly suited to pasture. The slope and the erosion hazard are the major management concerns. Rotation grazing, proper stocking rates, weed control, and applications of fertilizer will reduce the hazard of erosion.

Woodland.—The potential productivity of this soil for sugar maple is moderate. The slope limits the use of equipment.

Dwellings.—The slope is the main limitation. Special design helps to overcome this limitation.

Local roads and streets.—The slope is the main limitation. Constructing the roads on the contour and land shaping or grading will help to overcome this limitation.

Septic tank absorption fields.—The slope and the restricted permeability are the main limitations. Hillside seepage is a hazard.

Capability classification.—VIIe

VbE—Valois gravelly loam, 15 to 35 percent slopes, very stony. This soil is very deep, moderately steep and steep, and well drained. It is on the lower parts of valley walls. It formed in glacial till derived from sandstone and shale. Stones as much as 24 inches in diameter cover less than 1 percent to 3 percent of the surface. Areas are long and narrow and range from 10 to 500 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, dark brown gravelly loam that has 15 percent rock fragments
Subsoil:
8 to 14 inches, dark yellowish brown gravelly loam that has 15 percent rock fragments
14 to 34 inches, olive brown gravelly loam that has 30 percent rock fragments
Substratum:
34 to 60 inches, olive brown gravelly silt loam that has 30 percent rock fragments

Inclusions.—Included with this soil in mapping are areas of the more gravelly Chenango and Tunkhannock soils, the moderately deep Lordstown and Oquaga soils, and the moderately well drained Nunda and somewhat poorly drained Burdett soils on ridgetops. Also included are areas that do not have stones and boulders on the surface and areas that are eroded. Included areas are as much as 3 acres each in size and make up 20 to 25 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and subsoil and moderately rapid in the substratum
Available water capacity: Moderate
Soil reaction: Extremely acid to moderately acid in the surface layer and subsoil and very strongly acid to neutral in the substratum
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Very rapid
Erosion hazard: Severe

Use.—Most areas of this soil are used as woodland. A few areas are used as pasture.

Crops and pasture.—This soil is generally unsuited to cultivated crops and pasture. The slope, the stones on the surface, and the erosion hazard are the major management concerns.

Woodland.—The potential productivity of this soil for sugar maple is moderate. The slope limits the use of equipment.

Dwellings.—The slope is the main limitation. Special design helps to overcome this limitation.

Local roads and streets.—The slope is the main limitation. Constructing the roads on the contour and land shaping or grading will help to overcome this limitation.

Septic tank absorption fields.—The restricted permeability and the slope are the main limitations. Hillside seepage is a hazard.

Capability classification.—VIIs

VbF—Valois gravelly loam, 35 to 50 percent slopes, very stony. This soil is very deep, very steep, and well drained. It is on the sides of valley walls. It formed in glacial till derived from sandstone and shale. Stones as much as 24 inches in diameter cover less than 1 percent to 3 percent of the surface. Areas are long and narrow and range from 10 to 60 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 8 inches, dark brown gravelly loam that has 15 percent rock fragments

Subsoil:
- 8 to 14 inches, dark yellowish brown gravelly loam that has 15 percent rock fragments
- 14 to 34 inches, olive brown gravelly loam that has 30 percent rock fragments

Substratum:
- 34 to 60 inches, olive brown gravelly silt loam that has 30 percent rock fragments

Inclusions.—Included with this soil in mapping are areas of the more gravelly Chenango and Tunkhannock soils, the moderately deep Lordstown and Oquaga soils, and the moderately well drained Nunda and somewhat poorly drained Burdett soils on ridgetops. Also included are areas that do not have stones and boulders on the surface and areas that are eroded. Included areas are as much as 3 acres each in size and make up 15 to 20 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and subsoil and moderately rapid in the substratum
Available water capacity: Moderate
Soil reaction: Extremely acid to moderately acid in the surface layer and subsoil and very strongly acid to neutral in the substratum
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Very rapid
Erosion hazard: Very severe

Use.—Most areas of this soil are used as woodland. A few areas are used as pasture.

Crops and pasture.—This soil is generally unsuited to cultivated crops and pasture. The slope, the stones on the surface, and the erosion hazard are the major management concerns.

Woodland.—The potential productivity of this soil for sugar maple is moderate. The slope limits the use of equipment.

Dwellings.—The slope is the main limitation. Special design helps to overcome this limitation.

Local roads and streets.—The slope is the main limitation. Constructing the roads on the contour and land shaping or grading will help to overcome this limitation.

Septic tank absorption fields.—The restricted permeability and the slope are the main limitations. Hillside seepage is a hazard.

Capability classification.—VIIs

VdB—Valois-Nassau complex, undulating. This unit consists of a very deep, well drained Valois soil and a shallow, somewhat excessively drained Nassau soil. These soils formed in glacial till. Areas are mainly on the plane parts of hills and ridges that are underlain by twisted and folded shale, slate, and sandstone bedrock. The ridges run north to south, parallel to the Hudson River. Relief is complex and irregular. The Valois soil is on the concave part of the ridges, and the Nassau soil is on the sides and top. Slopes range from 1 to 8 percent. Areas are long and narrow and range from 5 to 75 acres in size. They are about 40 percent Valois soil, 40 percent Nassau soil, and 20 percent other soils. The Valois and Nassau soils occur as areas so intricately intermingled that it was not practical to map them separately.

The typical sequence, depth, and composition of the layers of the Valois soil are as follows—

Surface layer:
- 0 to 8 inches, dark brown gravelly loam that has 15 percent rock fragments

Subsoil:
- 8 to 14 inches, dark yellowish brown gravelly loam that has 15 percent rock fragments
- 14 to 34 inches, olive brown gravelly loam that has 30 percent rock fragments

Substratum:
- 34 to 60 inches, olive brown gravelly silt loam that has 30 percent rock fragments

Typically, the surface of the Nassau soil is covered by 1 inch of slightly decomposed leaves and moss. The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 3 inches, dark brown channery silt loam that has 15 percent rock fragments
Subsoil:
3 to 13 inches, brown very channery silt loam that has 60 percent rock fragments
13 to 18 inches, yellowish brown extremely channery silt loam that has 70 percent rock fragments
Bedrock:
18 inches, gray and light gray shale

Inclusions.—Included in this unit in mapping are small areas of moderately deep, well drained soils that are similar to the Nassau soil. Also included are the poorly drained and very poorly drained Alden soils in small depressions between the ridges and Hudson and Rhinebeck soils in other areas between the ridges. Included areas are as much as 3 acres each in size.

Major properties of the Valois soil—

Permeability: Moderate in the surface layer and subsoil and moderately rapid in the substratum
Available water capacity: Moderate
Soil reaction: Extremely acid to moderately acid in the surface layer and subsoil and very strongly acid to neutral in the substratum
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Medium
Erosion hazard: Slight

Major properties of the Nassau soil—

Permeability: Moderate throughout the profile
Available water capacity: Very low
Soil reaction: Strongly acid or very strongly acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 10 to 20 inches
Surface runoff: Medium
Erosion hazard: Moderate

Use.—Most of the acreage in this unit is used for permanent pasture, orchards, or woodland.

Crops and pasture.—This unit is moderately suited to cultivated crops. The available water capacity and depth to bedrock in the Nassau soil are the main limitations. Properly managing crop residue and adding other organic material increase the available water capacity. Irrigation is needed during extended dry periods. A conservation tillage system that leaves crop residue on the surface after plant'ng will help to control erosion.

Woodland.—The potential productivity of this unit for sugar maple is moderate. In areas of the Nassau soil, the available water capacity causes seedling mortality and the depth to bedrock limits the rooting depth, causing a windthrow hazard.

Dwellings.—The depth to bedrock in the Nassau soil is the main limitation.

Local roads and streets.—The depth to bedrock in the Nassau soil is the main limitation. The potential for frost action is a limitation in the Valois soil. A coarse grained subgrade will reduce the potential for frost action.

Septic tank absorption fields.—The depth to bedrock in the Nassau soil is the main limitation. The restricted permeability is a limitation in the Valois soil. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which effluent is absorbed in areas of the Valois soil.

Capability classification.—IIIe

VdD—Valois-Nassau complex, hilly. This unit consists of a very deep, well drained Valois soil and a shallow, somewhat excessively drained Nassau soil. These soils formed in glacial till. Areas are mainly on the plane parts of hills and ridges that are underlain by twisted and folded shale, slate, and sandstone bedrock. The ridges run north to south, parallel to the Hudson River. Relief is complex and irregular. The Valois soil is on the concave part of the ridges, and the Nassau soil is on the sides and top. Slopes range from 10 to 30 percent. Areas are long and narrow and range from 5 to 250 acres in size. They are about 40 percent Valois soil, 40 percent Nassau soil, and 20 percent other soils. The Valois and Nassau soils occur as areas so intricately intermingled that it was not practical to map them separately.

The typical sequence, depth, and composition of the layers of the Valois soil are as follows—

Surface layer:
0 to 8 inches, dark brown gravelly loam that has 15 percent rock fragments
Subsoil:
8 to 14 inches, dark yellowish brown gravelly loam that has 15 percent rock fragments
14 to 34 inches, olive brown gravelly loam that has 30 percent rock fragments
Substratum:
34 to 60 inches, olive brown gravelly silt loam that has 30 percent rock fragments

Typically, the surface of the Nassau soil is covered by 1 inch of slightly decomposed leaves and moss. The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 3 inches, dark brown channery silt loam that has 15 percent rock fragments
Subsoil:
3 to 13 inches, brown very channery silt loam that has 60 percent rock fragments
13 to 18 inches, yellowish brown extremely channery silt loam that has 70 percent rock fragments
Bedrock:
18 inches, gray and light gray shale

Inclusions.—Included in this unit in mapping are small areas of moderately deep, well drained soils that are similar to the Nassau soil. Also included are the poorly drained and very poorly drained Alden soils in small depressions between the ridges and Hudson and Rhinebeck soils in other areas between the ridges. Included areas are as much as 3 acres each in size.

Major properties of the Valois soil—

Permeability: Moderate in the surface layer and subsoil and moderately rapid in the substratum
Available water capacity: Moderate
Soil reaction: Extremely acid to moderately acid in the surface layer and subsoil and very strongly acid to neutral in the substratum
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Rapid
Erosion hazard: Severe

Major properties of the Nassau soil—

Permeability: Moderate throughout the profile
Available water capacity: Very low
Soil reaction: Strongly acid or very strongly acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 10 to 20 inches
Surface runoff: Very rapid
Erosion hazard: Very severe

Use.—Most of the acreage in this unit is used for permanent pasture, orchards, and woodland.

Crops and pasture.—This unit is poorly suited to cultivated crops. The slope and the erosion hazard are the major management concerns. The available water capacity and depth to bedrock in the Nassau soil also are limitations. Properly managing crop residue and adding other organic material increase the available water capacity. A conservation tillage system that leaves crop residue on the surface after planting and a crop rotation dominated by close-growing crops will help to control erosion.

Woodland.—The potential productivity of this unit for sugar maple is moderate. The slope limits the use of equipment. In areas of the Nassau soil, the available water capacity causes seedling mortality and the depth to bedrock limits the rooting depth, causing a windthrow hazard.

Dwellings.—The slope is a major limitation. The depth to bedrock in the Nassau soil also is a limitation. Special design and land shaping or grading will help to overcome the slope. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—The slope is a major limitation. The depth to bedrock in the Nassau soil also is a limitation.

Septic tank absorption fields.—The slope of both soils is a major limitation. The depth to bedrock in the Nassau soil and the restricted permeability in the Valois soil also are limitations. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which effluent is absorbed in areas of the Valois soil. Installing the distribution lines on the contour and providing distribution boxes or other structures that ensure even distribution of the effluent will increase the efficiency of the system.

Capability classification.—IVe

VeB—Vly very channery silt loam, 3 to 8 percent slopes. This soil is moderately deep, gently sloping, and well drained and somewhat excessively drained. It is in areas on the top of plateaus and benches where bedrock is close to the surface. It formed in glacial till derived from reddish sandstone, siltstone, and shale. Slopes are mainly convex. Areas are broad and range from 3 to 75 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 2 inches, dusky red channery silt loam that has 25 percent rock fragments
Subsoil:
2 to 11 inches, reddish brown very channery loam that has 35 percent rock fragments
11 to 21 inches, reddish brown very channery loam that has 60 percent rock fragments
21 to 28 inches, reddish brown very channery loam that has yellowish red mottles and 60 percent rock fragments

Bedrock:
28 inches, dark reddish brown, thinly bedded sandstone

Inclusions.—Included with this soil in mapping are small areas of exposed bedrock. Also included are the somewhat poorly drained and poorly drained, shallow Tor soils in seepy areas and on steps and benches; very stony or very bouldery soils; and the very deep Lewbeach and Willowemoc soils. Included areas are as much as 3 acres each in size and make up about 20 percent of the unit.

Major soil properties—

Permeability: Moderate throughout the profile
Available water capacity: Very low
Soil reaction: Extremely acid to strongly acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 20 to 40 inches
Surface runoff: Medium
Erosion hazard: Slight

Use.—Most areas of this soil are used as pasture or hayland. Some areas support brush. A few areas are wooded.

Crops and pasture.—This soil is well suited to cultivated crops. The available water capacity is the main limitation. A conservation tillage system that leaves crop residue on the surface after planting will help to control erosion. Properly managing crop residue and regularly adding other organic material will help to maintain good tilth and increase the available water capacity.

This soil is well suited to pasture. Rotation grazing, proper stocking rates, weed control, and applications of fertilizer will increase forage yields.

Woodland.—The potential productivity of this soil for sugar maple is moderate.

Dwellings.—The depth to bedrock is the main limitation, especially on sites for dwellings with basements. The bedrock is mainly hard sandstone and, though fractured in places, cannot be easily ripped. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—The depth to bedrock is the main limitation. Planning road locations and grades so that rock removal is not needed and adding fill material will minimize this limitation.

Septic tank absorption fields.—The depth to bedrock is the main limitation. A poor filtering capacity is a limitation, and contamination of the ground water is a hazard.

Capability classification.—IIe

VeC—Vly very channery silt loam, 8 to 15 percent slopes. This soil is moderately deep, sloping, and well drained and somewhat excessively drained. It is in areas on the top of plateaus and benches where bedrock is close to the surface. It formed in glacial till derived from reddish sandstone, siltstone, and shale. Slopes are mainly convex. Areas are broad and range from 3 to 75 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 2 inches, dusky red channery silt loam that has 25 percent rock fragments
Subsoil:
2 to 11 inches, reddish brown very channery loam that has 35 percent rock fragments
11 to 21 inches, reddish brown very channery loam that has 60 percent rock fragments
21 to 28 inches, reddish brown very channery loam that has yellowish red mottles and 60 percent rock fragments
Bedrock:
28 inches, dark reddish brown, thinly bedded sandstone

Inclusions.—Included with this soil in mapping are small areas of exposed bedrock. Also included are the somewhat poorly drained and poorly drained, shallow Tor soils in seepy areas and on steps and benches; very stony or very bouldery soils; and the very deep Lewbeach and Willowemoc soils. Included areas are as much as 3 acres each in size and make up about 10 to 20 percent of the unit.

Major soil properties—

Permeability: Moderate throughout the profile
Available water capacity: Very low
Soil reaction: Extremely acid to strongly acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 20 to 40 inches
Surface runoff: Medium
Erosion hazard: Moderate

Use.—Most areas of this soil are used as pasture or hayland. Some areas support brush. A few areas are wooded.

Crops and pasture.—This soil is moderately suited to

cultivated crops. The available water capacity is the main limitation. A conservation tillage system that leaves crop residue on the surface after planting and contour farming or stripcropping will help to control erosion. Properly managing crop residue and regularly adding other organic material will help to maintain good tilth and increase the available water capacity.

This soil is well suited to pasture. Rotation grazing, proper stocking rates, weed control, and applications of fertilizer will increase forage yields.

Woodland.—The potential productivity of this soil for sugar maple is moderate.

Dwellings.—The depth to bedrock is the main limitation, especially on sites for dwellings with basements. The bedrock is mainly hard sandstone and, though fractured in places, cannot be easily ripped. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—The depth to bedrock, the slope, and the potential for frost action are the main limitations. Special design will help to overcome the slope. A coarse grained subgrade will reduce the potential for frost action.

Septic tank absorption fields.—The depth to bedrock is the main limitation. A poor filtering capacity is a limitation, and contamination of the ground water is a hazard.

Capability classification.—IIIe

VeD—Vly very channery silt loam, 15 to 25 percent slopes. This soil is moderately deep, moderately steep, and well drained and somewhat excessively drained. It is in areas on the top of plateaus and benches where bedrock is close to the surface. It formed in glacial till derived from reddish sandstone, siltstone, and shale. Slopes are mainly convex. Areas are long and narrow and range from 3 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 2 inches, dusky red channery silt loam that has 25 percent rock fragments

Subsoil:
- 2 to 11 inches, reddish brown very channery loam that has 35 percent rock fragments
- 11 to 21 inches, reddish brown very channery loam that has 60 percent rock fragments
- 21 to 28 inches, reddish brown very channery loam that has yellowish red mottles and 60 percent rock fragments

Bedrock:
- 28 inches, dark reddish brown, thinly bedded sandstone

Inclusions.—Included with this soil in mapping are small areas of exposed bedrock. Also included are the somewhat poorly drained and poorly drained, shallow Tor soils in seepy areas and on steps and benches; very stony or very bouldery soils; and the very deep Lewbeach and Willowemoc soils. Included areas are as much as 3 acres each in size and make up about 10 to 15 percent of the unit.

Major soil properties—

Permeability: Moderate throughout the profile
Available water capacity: Very low
Soil reaction: Extremely acid to strongly acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 20 to 40 inches
Surface runoff: Rapid
Erosion hazard: Severe

Use.—Most areas of this soil support brush or are used as woodland. A few areas are used as pasture or hayland.

Crops and pasture.—This soil is poorly suited to cultivated crops. The slope and the available water capacity are the main limitations. A conservation tillage system that leaves crop residue on the surface after planting, contour farming or stripcropping, and a crop rotation dominated by close-growing crops will help to control erosion. Properly managing crop residue and regularly adding other organic material will help to maintain good tilth and increase the available water capacity.

This soil is moderately suited to pasture. Deferment of grazing during droughty periods will help to control erosion. Controlled grazing, rotation grazing, proper stocking rates, weed control, and applications of fertilizer will increase forage yields.

Woodland.—The potential productivity of this soil for sugar maple is moderate. The slope limits the use of equipment.

Dwellings.—The depth to bedrock and the slope are the main limitations, especially on sites for dwellings with basements. The bedrock is mainly hard sandstone and, though fractured in places, cannot be easily ripped. Special design will help to overcome the slope. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—The depth to bedrock, the slope, and the potential for frost action are the main limitations. Special design will help to overcome the slope. A coarse grained subgrade will reduce the potential for frost action.

Septic tank absorption fields.—The depth to bedrock and the slope are the main limitations. A poor filtering capacity is a limitation, and contamination of the ground water is a hazard.

Capability classification.—IVe

VhC—Vly-Halcott complex, rolling, very rocky. This unit consists of gently sloping and moderately sloping soils on the top and sides of benches and bedrock-controlled ridges. Slopes are generally irregular and commonly occur as a series of steps. They range from 3 to 15 percent. Areas are long and narrow or broad and irregular in shape and range from 5 to 300 acres in size. They are about 40 percent moderately deep, well drained and somewhat excessively drained Vly soil; 35 percent shallow, somewhat excessively drained to moderately well drained Halcott soil; and 25 percent other soils and rock outcrop. The rock outcrop covers 2 to 10 percent of the surface. The Vly and Halcott soils occur as areas so intricately intermingled that it was not practical to map them separately.

The typical sequence, depth, and composition of the layers of the Vly soil are as follows—

Surface layer:
- 0 to 2 inches, dusky red channery silt loam that has 25 percent rock fragments

Subsoil:
- 2 to 11 inches, reddish brown very channery loam that has 35 percent rock fragments
- 11 to 21 inches, reddish brown very channery loam that has 60 percent rock fragments
- 21 to 28 inches, reddish brown very channery loam that has yellowish red mottles and 60 percent rock fragments

Bedrock:
- 28 inches, dark reddish brown, thinly bedded sandstone

Typically, the surface of the Halcott soil is covered by 1 inch of slightly decomposed leaf litter. The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 5 inches, dark reddish brown channery silt loam that has 30 percent rock fragments

Subsoil:
- 5 to 13 inches, dark reddish brown and dark red very channery silt loam that has 60 percent rock fragments

Bedrock:
- 13 inches, dark reddish brown, thinly bedded sandstone

Inclusions.—Included in this unit in mapping are small areas of exposed bedrock. Also included are the somewhat poorly drained and poorly drained, shallow Tor soils in seepy areas and on steps and benches; very stony or very bouldery soils; and the very deep Lewbeach and Willowemoc soils. Included areas are as much as 3 acres each in size.

Major properties of the Vly soil—

Permeability: Moderate throughout the profile
Available water capacity: Very low
Soil reaction: Extremely acid to strongly acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 20 to 40 inches
Surface runoff: Medium
Erosion hazard: Moderate

Major properties of the Halcott soil—

Permeability: Moderate throughout the profile
Available water capacity: Very low
Soil reaction: Extremely acid to strongly acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 10 to 20 inches
Surface runoff: Medium
Erosion hazard: Moderate

Use.—Most of the acreage in this unit is woodland. A few areas support brush or are used as permanent pasture.

Crops and pasture.—This unit is generally unsuited to cultivated crops and poorly suited to pasture. The depth to bedrock and the ledges and outcrops are the major limitations. The available water capacity also is a limitation, especially in areas of the Halcott soil. Controlled grazing, rotation grazing, applications of fertilizer, and weed and brush control will increase forage yields.

Woodland.—The potential productivity is moderate for sugar maple on the Vly soil and for northern red oak on the Halcott soil. In areas of the Vly soil, seedling mortality is a hazard caused by the depth to bedrock and the available water capacity. Windthrow is a hazard because the rooting depth is restricted.

Dwellings.—The depth to bedrock, especially in the Halcott soil, is the main limitation. Constructing above the bedrock and adding fill as needed will help to overcome this limitation. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—The depth to bedrock in the Halcott soil is the main limitation. The slope, the potential for frost action, and the depth to bedrock are limitations in areas of the Vly soil. A coarse grained subgrade will reduce the potential for frost action. Special design will help to overcome the slope.

Septic tank absorption fields.—The depth to bedrock is the main limitation. A poor filtering capacity is a limitation, and contamination of the ground water is a hazard.

Capability classification.—VIs

VhD—Vly-Halcott complex, hilly, very rocky. This unit consists of moderately steep and steep soils on the sides of benches and bedrock-controlled ridges. Slopes are generally irregular and commonly occur as a series of steps. They range from 15 to 35 percent. Areas are mainly long and narrow and range from 5 to 500 acres in size. They are about 40 percent moderately deep, well drained and somewhat excessively drained Vly soil; 35 percent shallow, somewhat excessively drained to moderately well drained Halcott soil; and 25 percent other soils and rock outcrop. The rock outcrop covers 2 to 10 percent of the surface. The Vly and Halcott soils occur as areas so intricately intermingled that it was not practical to map them separately.

The typical sequence, depth, and composition of the layers of the Vly soil are as follows—

Surface layer:
- 0 to 2 inches, dusky red channery silt loam that has 25 percent rock fragments

Subsoil:
- 2 to 11 inches, reddish brown very channery loam that has 35 percent rock fragments
- 11 to 21 inches, reddish brown very channery loam that has 60 percent rock fragments
- 21 to 28 inches, reddish brown very channery loam that has yellowish red mottles and 60 percent rock fragments

Bedrock:
- 28 inches, dark reddish brown, thinly bedded sandstone

Typically, the surface of the Halcott soil is covered by 1 inch of slightly decomposed leaf litter. The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 5 inches, dark reddish brown channery silt loam that has 30 percent rock fragments

Subsoil:
- 5 to 13 inches, dark reddish brown and dark red very channery silt loam that has 60 percent rock fragments

Bedrock:
- 13 inches, dark reddish brown, thinly bedded sandstone

Inclusions.—Included in this unit in mapping are small areas of exposed bedrock. Also included are the somewhat poorly drained and poorly drained, shallow Tor soils in seepy areas and on steps and benches; stony or very bouldery soils; and the very deep Lewbeach and Willowemoc soils. Included areas are as much as 3 acres each in size.

Major properties of the Vly soil—

Permeability: Moderate throughout the profile
Available water capacity: Very low
Soil reaction: Extremely acid to strongly acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 20 to 40 inches
Surface runoff: Rapid
Erosion hazard: Severe

Major properties of the Halcott soil—

Permeability: Moderate throughout the profile
Available water capacity: Very low
Soil reaction: Extremely acid to strongly acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 10 to 20 inches
Surface runoff: Rapid
Erosion hazard: Severe

Use.—Most of the acreage in this unit is woodland. A few areas support brush or are used as permanent pasture.

Crops and pasture.—This unit is generally unsuited to cultivated crops and pasture. The slope, the depth to bedrock, and the ledges and outcrops are the major limitations. The available water capacity also is a limitation, especially in areas of the Halcott soil.

Woodland.—The potential productivity is moderate for sugar maple on the Vly soil and for northern red oak on the Halcott soil. The slope limits the use of equipment. In areas of the Vly soil, seedling mortality is a hazard caused by the depth to bedrock and the available water

capacity. Windthrow is a hazard because the rooting depth is restricted.

Dwellings.—The depth to bedrock, especially in the Halcott soil, and the slope are the main limitations. Constructing above the bedrock and adding fill as needed will help to overcome the depth to bedrock. Special design and grading and land shaping will help to overcome the slope. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—The depth to bedrock in the Halcott soil and the slope are the main limitations. Special design will help to overcome the slope.

Septic tank absorption fields.—The depth to bedrock and the slope are the main limitations. A poor filtering capacity is a limitation, and contamination of the ground water is a hazard.

Capability classification.—VIIs

VhF—Vly-Halcott complex, very steep, very rocky. This unit consists of very steep soils on the sides of benches and bedrock-controlled ridges. Slopes are generally irregular and commonly occur as a series of steps. They range from 35 to 55 percent. Areas are mainly long and narrow or broad and irregularly shaped and range from 5 to 150 acres in size. They are about 40 percent moderately deep, well drained and somewhat excessively drained Vly soil; 35 percent shallow, somewhat excessively drained to moderately well drained Halcott soil; and 25 percent other soils and rock outcrop. The rock outcrop covers 2 to 10 percent of the surface. The Vly and Halcott soils occur as areas so intricately intermingled that it was not practical to map them separately.

The typical sequence, depth, and composition of the layers of the Vly soil are as follows—

Surface layer:
0 to 2 inches, dusky red channery silt loam that has 25 percent rock fragments
Subsoil:
2 to 11 inches, reddish brown very channery loam that has 35 percent rock fragments
11 to 21 inches, reddish brown very channery loam that has 60 percent rock fragments
21 to 28 inches, reddish brown very channery loam that has yellowish red mottles and 60 percent rock fragments
Bedrock:
28 inches, dark reddish brown, thinly bedded sandstone

Typically, the surface of the Halcott soil is covered by 1 inch of slightly decomposed leaf litter. The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 5 inches, dark reddish brown channery silt loam that has 30 percent rock fragments
Subsoil:
5 to 13 inches, dark reddish brown and dark red very channery silt loam that has 60 percent rock fragments
Bedrock:
13 inches, dark reddish brown, thinly bedded sandstone

Inclusions.—Included in this unit in mapping are small areas of exposed bedrock. Also included are the somewhat poorly drained and poorly drained, shallow Tor soils in seepy areas and on steps and benches; stony or very bouldery soils; and the very deep Lewbeach and Willowemoc soils. Included areas are as much as 3 acres each in size.

Major properties of the Vly soil—

Permeability: Moderate throughout the profile
Available water capacity: Very low
Soil reaction: Extremely acid to strongly acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 20 to 40 inches
Surface runoff: Very rapid
Erosion hazard: Very severe

Major properties of the Halcott soil—

Permeability: Moderate throughout the profile
Available water capacity: Very low
Soil reaction: Extremely acid to strongly acid throughout the profile
Depth to the seasonal high water table: More than 6 feet
Flooding: None
Depth to bedrock: 10 to 20 inches
Surface runoff: Very rapid
Erosion hazard: Very severe

Use.—Most of the acreage in this unit is woodland. A few areas support brush.

Crops and pasture.—This unit is generally unsuited to cultivated crops and pasture. The slope, the depth to bedrock, and the ledges and outcrops are the major limitations. The available water capacity also is a limitation, especially in areas of the Halcott soil.

Woodland.—The potential productivity is moderate for sugar maple on the Vly soil and for northern red oak on the Halcott soil. The slope limits the use of equipment. In areas of the Vly soil, seedling mortality is a hazard

caused by the depth to bedrock and the available water capacity. Windthrow is a hazard because the rooting depth is restricted.

Dwellings.—The depth to bedrock, especially in the Halcott soil, and the slope are the main limitations.

Local roads and streets.—The depth to bedrock in the Halcott soil and the slope are the main limitations. Special design and grading and land shaping will help to overcome the slope.

Septic tank absorption fields.—The depth to bedrock and the slope are the main limitations. A poor filtering capacity is a limitation, and contamination of the ground water is a hazard.

Capability classification.—VIIs

VoA—Volusia channery loam, 0 to 3 percent slopes. This soil is very deep, nearly level, and somewhat poorly drained. It is on the plane parts of hilltops and foot slopes and in drainageways. It formed in glacial till derived from shale, siltstone, and sandstone. Areas are broad and irregular in shape and range from 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 7 inches, dark brown channery loam that has 20 percent rock fragments

Subsurface layer:
- 7 to 12 inches, olive gray channery silt loam that has 20 percent rock fragments

Subsoil:
- 12 to 28 inches, olive brown, very firm and brittle channery silt loam that has dark grayish brown mottles
- 28 to 60 inches, a fragipan of dark grayish brown, very firm, dense and brittle channery silt loam that has light olive brown and light brownish gray mottles

Inclusions.—Included with this soil in mapping are small areas of the moderately well drained Mardin soils on the slightly higher parts of the landscape, the poorly drained and very poorly drained Alden soils in depressions and drainageways, the shallow Tuller and Arnot soils, stony or very stony soils, and eroded soils. Included areas make up 15 to 25 percent of the unit and are as much as 3 acres each in size.

Major soil properties—

Permeability: Moderate in the surface layer and the upper part of the subsoil and slow or very slow in the fragipan
Available water capacity: Low
Soil reaction: Very strongly acid to slightly acid in the surface layer and the upper part of the subsoil and strongly acid to neutral in the lower part of the subsoil
Depth to the seasonal high water table: 6 inches to 1.5 feet (December through May)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Slow
Erosion hazard: None or slight

Use.—Most areas of this soil are used as hayland or permanent pasture. Some areas are wooded.

Crops and pasture.—This soil is moderately suited to cultivated crops. Wetness is the main limitation. A conservation tillage system that leaves crop residue on the surface after planting will help to control erosion. A subsurface drainage system will reduce the wetness. Properly managing crop residue and adding other organic material will help to maintain good tilth.

This soil is well suited to pasture. Deferment of grazing during wet periods will help to keep the pasture in good condition. Rotation grazing, proper stocking rates, weed control, and applications of fertilizer will increase forage yields.

Woodland.—The potential productivity of this soil for northern red oak is moderate. Wetness limits the use of equipment and causes seedling mortality and windthrow.

Dwellings.—Wetness is the main limitation. Grading so that surface water moves away from the dwellings, installing interceptor drains that divert water from the higher adjacent areas, and installing drains around footings and foundations will reduce the wetness.

Local roads and streets.—Wetness and the potential for frost action are the main limitations. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action. Raised fill material and a drainage system will reduce the wetness.

Septic tank absorption fields.—Wetness and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept runoff from the higher adjacent areas. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which effluent is absorbed.

Capability classification.—IIIw

VoB—Volusia channery loam, 3 to 8 percent slopes. This soil is very deep, gently sloping, and somewhat poorly drained. It is on the plane parts of hilltops and foot slopes and in drainageways. It formed in glacial till derived from shale, siltstone, and

sandstone. Areas are broad and irregular in shape and range from 5 to 150 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 7 inches, dark brown channery loam that has 20 percent rock fragments

Subsurface layer:
- 7 to 12 inches, olive gray channery silt loam that has 20 percent rock fragments

Subsoil:
- 12 to 28 inches, olive brown, very firm and brittle channery silt loam that has dark grayish brown mottles
- 28 to 60 inches, a fragipan of dark grayish brown, very firm, dense and brittle channery silt loam that has light olive brown and light brownish gray mottles

Inclusions.—Included with this soil in mapping are small areas of the moderately well drained Mardin soils on the slightly higher parts of the landscape, the poorly drained and very poorly drained Alden soils in depressions and drainageways, the shallow Tuller and Arnot soils, stony or very stony soils, and eroded soils. Included areas are as much as 3 acres each in size and make up 15 to 25 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and the upper part of the subsoil and slow or very slow in the fragipan
Available water capacity: Low
Soil reaction: Very strongly acid to slightly acid in the surface layer and the upper part of the subsoil and strongly acid to neutral in the lower part of the subsoil
Depth to the seasonal high water table: 6 inches to 1.5 feet (December through May)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Medium
Erosion hazard: Slight

Use.—Most areas of this soil are used as hayland or permanent pasture. Some areas are wooded.

Crops and pasture.—This soil is moderately suited to cultivated crops. Wetness is the main limitation. A conservation tillage system that leaves crop residue on the surface after planting will help to control erosion. A subsurface drainage system will reduce the wetness. Properly managing crop residue and adding other organic material will help to maintain good tilth.

This soil is well suited to pasture. Deferment of grazing during wet periods will help to keep the pasture in good condition. Rotation grazing, proper stocking rates, weed control, and applications of fertilizer will increase forage yields.

Woodland.—The potential productivity of this soil for northern red oak is moderate. Wetness limits the use of equipment and causes seedling mortality and windthrow.

Dwellings.—Wetness is the main limitation. Grading so that surface water moves away from the dwellings, installing interceptor drains that divert water from the higher adjacent areas, and installing drains around footings and foundations will reduce the wetness.

Local roads and streets.—Wetness and the potential for frost action are the main limitations. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action. Raised fill material and a drainage system will reduce the wetness.

Septic tank absorption fields.—Wetness and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept runoff from the higher adjacent areas. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which effluent is absorbed.

Capability classification.—IIIw

VoC—Volusia channery loam, 8 to 15 percent slopes. This soil is very deep, strongly sloping, and somewhat poorly drained. It is on hilltops and foot slopes and in drainageways. It formed in glacial till derived from shale, siltstone, and sandstone. Areas are broad and irregular in shape and range from 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 7 inches, dark brown channery loam that has 20 percent rock fragments

Subsurface layer:
- 7 to 12 inches, olive gray channery silt loam that has 20 percent rock fragments

Subsoil:
- 12 to 28 inches, olive brown, very firm and brittle channery silt loam that has dark grayish brown mottles
- 28 to 60 inches, a fragipan of dark grayish brown, very firm, dense and brittle channery silt loam that has light olive brown and light brownish gray mottles

Inclusions.—Included with this soil in mapping are small areas of the moderately well drained Mardin soils

on the slightly higher parts of the landscape, the poorly drained and very poorly drained Alden soils in depressions and drainageways, the shallow Tuller and Arnot soils, stony or very stony soils, and eroded soils. Included areas are as much as 3 acres each in size and make up 15 to 25 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and the upper part of the subsoil and slow or very slow in the fragipan
Available water capacity: Low
Soil reaction: Very strongly acid to slightly acid in the surface layer and the upper part of the subsoil and strongly acid to neutral in the lower part of the subsoil
Depth to the seasonal high water table: 6 inches to 1.5 feet (December through May)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Medium
Erosion hazard: Moderate

Use.—Most areas of this soil are used as hayland or permanent pasture. Some areas are wooded.

Crops and pasture.—This soil is moderately suited to cultivated crops. Wetness and the erosion hazard are the main management concerns. A conservation tillage system that leaves crop residue on the surface after planting and contour farming or stripcropping will help to control erosion. A subsurface drainage system will reduce the wetness. Properly managing crop residue and adding other organic material will help to maintain good tilth.

This soil is well suited to pasture. Deferment of grazing during wet periods will help to keep the pasture in good condition. Rotation grazing, proper stocking rates, weed control, and applications of fertilizer will increase forage yields.

Woodland.—The potential productivity of this soil for northern red oak is moderate. Wetness limits the use of equipment and causes seedling mortality and windthrow.

Dwellings.—Wetness is the main limitation. Grading so that surface water moves away from the dwellings, installing interceptor drains that divert water from the higher adjacent areas, and installing drains around footings and foundations will reduce the wetness. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—Wetness and the potential for frost action are the main limitations. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action. Raised fill material and a drainage system will reduce the wetness.

Septic tank absorption fields.—Wetness and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept runoff from the higher adjacent areas. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which effluent is absorbed.

Capability classification.—IIIe

VpC—Volusia channery silt loam, 3 to 15 percent slopes, very stony. This soil is very deep, gently sloping to strongly sloping, and somewhat poorly drained. It is on the concave parts of hilltops and foot slopes. It formed in glacial till derived from shale, siltstone, and sandstone. Stones as much as 24 inches in diameter cover as much as 3 percent of the surface. Areas are broad and irregular in shape and range from 5 to 60 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 7 inches, dark brown channery loam that has 20 percent rock fragments
Subsurface layer:
7 to 12 inches, olive gray channery silt loam that has 20 percent rock fragments
Subsoil:
12 to 28 inches, olive brown, very firm and brittle channery silt loam that has dark grayish brown mottles
28 to 60 inches, a fragipan of dark grayish brown, very firm, dense and brittle channery silt loam that has light olive brown and light brownish gray mottles

Inclusions.—Included with this soil in mapping are small areas of the moderately well drained Mardin soils on the slightly higher parts of the landscape, the poorly drained and very poorly drained Alden soils in depressions and drainageways, the shallow Tuller and Arnot soils, stony soils, and eroded soils. Included areas are as much as 3 acres each in size and make up 15 to 25 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and the upper part of the subsoil and slow or very slow in the fragipan

Available water capacity: Low
Soil reaction: Very strongly acid to slightly acid in the surface layer and the upper part of the subsoil and strongly acid to neutral in the lower part of the subsoil
Depth to the seasonal high water table: 6 inches to 1.5 feet (December through May)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Medium
Erosion hazard: Moderate

Use.—Most areas of this soil are used as hayland or permanent pasture. Some areas are wooded.

Crops and pasture.—This soil is generally unsuited to cultivated crops and pasture. The stones on the surface are the major limitation. Wetness and erosion also are management concerns.

Woodland.—The potential productivity of this soil for northern red oak is moderate. Wetness limits the use of equipment and causes seedling mortality and windthrow.

Dwellings.—Wetness is the main limitation. Grading so that surface water moves away from the dwellings, installing interceptor drains that divert water from the higher adjacent areas, and installing drains around footings and foundations will reduce the wetness. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—Wetness and the potential for frost action are the main limitations. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action. Raised fill material and a drainage system will reduce the wetness.

Septic tank absorption fields.—Wetness and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept runoff from the higher adjacent areas. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which effluent is absorbed.

Capability classification.—VIIs

Wa—Wayland silt loam. This soil is very deep, nearly level, and poorly drained and very poorly drained. It is on flood plains. It formed in recent alluvial deposits along streams. Slopes range from 0 to 3 percent. Areas are long and narrow and range from 5 to 40 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 9 inches, very dark grayish brown silt loam
Subsoil:
9 to 20 inches, olive gray silt loam that has grayish brown mottles
20 to 29 inches, gray silty clay loam that has dark brown mottles
Substratum:
29 to 49 inches, light gray silty clay loam
49 to 60 inches, dark gray very gravelly loam that has 35 percent rock fragments

Inclusions.—Included with this soil in mapping are small areas of Fluvaquents and Udifluvents. These soils are nearer the stream channels than the Wayland soil and are subject to frequent depositions of sediment. Also included are areas of the somewhat poorly drained Middlebury and moderately well drained Basher soils on the slightly higher parts of the flood plains and areas of the very poorly drained Carlisle soils in depressions. Included areas are as much as 3 acres each in size and make up about 20 to 25 percent of the unit.

Major soil properties—

Permeability: Moderate or moderately slow in the surface layer and slow in the subsoil and substratum
Available water capacity: High
Soil reaction: Strongly acid to mildly alkaline in the surface layer and strongly acid to moderately alkaline in the subsoil
Depth to the seasonal high water table: 0 to 6 inches (November through June)
Flooding: Frequent (November through June)
Depth to bedrock: More than 60 inches
Surface runoff: Slow
Erosion hazard: None

Use.—Most of the acreage in this unit is woodland.

Crops and pasture.—This soil is generally unsuited to cultivated crops and poorly suited to pasture. Flooding and wetness are the major management concerns. A drainage system is needed for optimum yields. Deferment of grazing during wet periods, proper stocking rates, and weed control will increase forage yields.

Woodland.—The potential productivity of this soil for red maple is moderate. Wetness limits the use of equipment and causes seedling mortality and windthrow.

Dwellings.—Flooding is the main hazard, and wetness is a limitation, especially on sites for dwellings with basements.

Local roads and streets.—Flooding and the potential

for frost action are the main management concerns. Raised fill of coarse grained subgrade will minimize these limitations.

Septic tank absorption fields.—Wetness and flooding are the main management concerns. A poor filtering capacity is a limitation, and contamination of the ground water is a hazard, especially during periods of flooding.

Capability classification.—Vw

WeB—Wellsboro channery loam, 3 to 8 percent slopes. This soil is very deep, gently sloping, and moderately well drained. It is on the plane parts of ridges and hills in the Catskill Mountains and their foothills. It formed in glacial till derived from sandstone, siltstone, and shale. Areas are irregular in shape and range from 5 to 100 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 8 inches, dark brown channery loam that has 15 percent rock fragments

Subsoil:
- 8 to 16 inches, brown channery silt loam that has 20 percent rock fragments
- 16 to 20 inches, reddish brown channery silt loam that has strong brown mottles and 20 percent rock fragments
- 20 to 60 inches, a fragipan of reddish brown, very firm and brittle channery silt loam that has pinkish gray and strong brown mottles and 25 percent rock fragments

Inclusions.—Included with this soil in mapping are small areas of the somewhat poorly drained Morris and poorly drained Alden soils in shallow drainageways and depressions. Also included are the shallow Arnot and moderately deep Oquaga soils in areas on side slopes where bedrock is closer to the surface, areas that have stones on the surface, and eroded areas. Included areas are as much as 3 acres each in size and make up 10 to 25 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and the upper part of the subsoil and slow in the fragipan
Available water capacity: Moderate
Soil reaction: Very strongly acid to moderately acid throughout the profile
Depth to the seasonal high water table: 1.5 to 3.0 feet (November through March)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Medium
Erosion hazard: Slight

Use.—Most areas of this soil are used as hayland or pasture. A few areas are used for cultivated crops.

Crops and pasture.—This soil is well suited to cultivated crops. Wetness delays planting in years of high rainfall. A conservation tillage system that leaves crop residue on the surface after planting will reduce the hazard of erosion. A subsurface drainage system is needed in the wetter areas. Properly managing crop residue and adding other organic material will help to maintain tilth and the organic matter content.

This soil is well suited to pasture. Rotation grazing, proper stocking rates, applications of fertilizer, and weed control will increase forage yields.

Woodland.—The potential productivity of this soil for northern red oak is moderately high.

Dwellings.—Wetness is the main limitation, especially on sites for dwellings with basements. Grading so that surface water moves away from the dwellings, installing interceptor drains that divert water from the higher adjacent areas, and installing drains around footings and foundations will reduce the wetness.

Local roads and streets.—Wetness and the potential for frost action are the main limitations. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action. Raised fill material and a drainage system will reduce the wetness.

Septic tank absorption fields.—Wetness and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept runoff from the higher adjacent areas. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which effluent is absorbed.

Capability classification.—IIw

WeC—Wellsboro channery loam, 8 to 15 percent slopes. This soil is very deep, strongly sloping, and moderately well drained. It is on the top and sides of ridges and hills in the Catskill Mountains and their foothills. It formed in glacial till derived from sandstone, siltstone, and shale. Areas are irregular in shape and range from 5 to 100 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 8 inches, dark brown channery loam that has 15 percent rock fragments

Subsoil:
- 8 to 16 inches, brown channery silt loam that has 20 percent rock fragments
- 16 to 20 inches, reddish brown channery silt loam

that has strong brown mottles and 20 percent rock fragments
20 to 60 inches, a fragipan of reddish brown, very firm and brittle channery silt loam that has pinkish gray and strong brown mottles and 25 percent rock fragments

Inclusions.—Included with this soil in mapping are small areas of the somewhat poorly drained Morris and poorly drained Alden soils in shallow drainageways and depressions. Also included are the shallow Arnot and moderately deep Oquaga soils in areas on side slopes where bedrock is closer to the surface, areas that have stones on the surface, and eroded areas. Included areas are as much as 3 acres each in size and make up 10 to 25 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and the upper part of the subsoil and slow in the fragipan
Available water capacity: Moderate
Soil reaction: Very strongly acid to moderately acid throughout the profile
Depth to the seasonal high water table: 1.5 to 3.0 feet (November through March)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Medium
Erosion hazard: Moderate

Use.—Most areas of this soil are used as hayland or pasture. A few areas are used for cultivated crops.

Crops and pasture.—This soil is moderately suited to cultivated crops. Erosion is the main hazard. Wetness delays planting in years of high rainfall. A conservation tillage system that leaves crop residue on the surface after planting and contour farming or stripcropping will reduce the hazard of erosion. A subsurface drainage system is needed in the wetter areas. Properly managing crop residue and adding other organic material will help to maintain tilth and the organic matter content.

This soil is well suited to pasture. Rotation grazing, proper stocking rates, applications of fertilizer, and weed control will increase forage yields.

Woodland.—The potential productivity of this soil for northern red oak is moderately high.

Dwellings.—Wetness is the main limitation, especially on sites for dwellings with basements. Grading so that surface water moves away from the dwellings, installing interceptor drains that divert water from the higher adjacent areas, and installing drains around footings and foundations will reduce the wetness. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—Wetness, the slope, and the potential for frost action are the main limitations. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action. Raised fill material and a drainage system will reduce the wetness. Land shaping or grading and special design will help to overcome the slope.

Septic tank absorption fields.—Wetness and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept runoff from the higher adjacent areas. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which effluent is absorbed.

Capability classification.—IIIe

WeD—Wellsboro channery loam, 15 to 25 percent slopes. This soil is very deep, moderately steep, and moderately well drained. It is on the sides of ridges and hills in the Catskill Mountains and their foothills. It formed in glacial till derived from sandstone, siltstone, and shale. Areas are irregular in shape and range from 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, dark brown channery loam that has 15 percent rock fragments
Subsoil:
8 to 16 inches, brown channery silt loam that has 20 percent rock fragments
16 to 20 inches, reddish brown channery silt loam that has strong brown mottles and 20 percent rock fragments
20 to 60 inches, a fragipan of reddish brown, very firm and brittle channery silt loam that has pinkish gray and strong brown mottles and 25 percent rock fragments

Inclusions.—Included with this soil in mapping are small areas of the somewhat poorly drained Morris and poorly drained Alden soils in shallow drainageways and depressions. Also included are the shallow Arnot and moderately deep Oquaga soils in areas on side slopes where bedrock is closer to the surface, areas that have stones on the surface, and eroded areas. Included areas are as much as 3 acres each in size and make up 10 to 25 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and the upper part of the subsoil and slow in the fragipan
Available water capacity: Moderate
Soil reaction: Very strongly acid to moderately acid throughout the profile
Depth to the seasonal high water table: 1.5 to 3.0 feet (November through March)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Rapid
Erosion hazard: Severe

Use.—Most areas of this soil are used as hayland or pasture. A few areas are used for cultivated crops.

Crops and pasture.—This soil is poorly suited to cultivated crops. The hazard of erosion and the slope are the main management concerns. Wetness delays planting in years of high rainfall. A conservation tillage system that leaves crop residue on the surface after planting, contour farming or stripcropping, and a crop rotation dominated by close-growing crops will reduce the hazard of erosion. A subsurface drainage system is needed in the wetter areas. Properly managing crop residue and adding other organic material will help to maintain tilth and the organic matter content.

This soil is moderately suited to pasture. Erosion is a hazard. Deferment of grazing during wet periods and controlled grazing will help to control erosion. Rotation grazing, proper stocking rates, applications of fertilizer, and weed control will increase forage yields.

Woodland.—The potential productivity of this soil for northern red oak is moderately high. The slope limits the use of equipment.

Dwellings.—Wetness and the slope are the main limitations, especially on sites for dwellings with basements. Grading so that surface water moves away from the dwellings, installing interceptor drains that divert water from the higher adjacent areas, and installing drains around footings and foundations will reduce the wetness. Special design will help to overcome the slope. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—The slope is the main limitation. Land shaping or grading and special design will help to overcome this limitation.

Septic tank absorption fields.—Wetness, the slope, and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept runoff from the higher adjacent areas. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which effluent is absorbed. Installing the distribution lines on the contour and providing drop boxes or similar structures will increase the efficiency of the system.

Capability classification.—IVe

WmB—Willowemoc channery silt loam, 3 to 8 percent slopes. This soil is very deep, gently sloping, and moderately well drained. It is on the top and sides of hills and ridges in the Catskill Mountains. It formed in glacial till derived from reddish sandstone, siltstone, and shale. Areas are broad and range from 5 to 100 acres in size.

Typically, the surface is covered by 1 inch of leaf litter. The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 6 inches, dark reddish brown channery silt loam that has 25 percent rock fragments

Subsoil:
6 to 14 inches, reddish brown channery loam that has 20 percent rock fragments
14 to 18 inches, reddish brown channery loam that has brown and strong brown mottles and 20 percent rock fragments
18 to 21 inches, reddish brown channery loam that has strong brown mottles and 20 percent rock fragments
21 to 60 inches, a fragipan of reddish brown, very firm and brittle channery loam that has 30 percent rock fragments

Inclusions.—Included with this soil in mapping are small areas of the somewhat poorly drained Lewbeach and poorly drained and very poorly drained Suny soils in drainageways and depressions. Also included are areas of the moderately deep Vly and shallow Halcott soils on side slopes, areas that have stones on the surface, and eroded areas. Included areas are as much as 3 acres each in size and make up 15 to 25 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and the upper part of the subsoil and slow or very slow in the fragipan
Available water capacity: Moderate
Soil reaction: Extremely acid to strongly acid throughout the profile
Depth to the seasonal high water table: 1.5 to 2.5 feet (October through May)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Medium
Erosion hazard: Slight

Use.—Most areas of this soil are used as hayland or pasture. A few areas are used for cultivated crops.

Crops and pasture.—This soil is well suited to cultivated crops. Wetness delays planting in years of high rainfall. A conservation tillage system that leaves crop residue on the surface after planting will reduce the hazard of erosion. A subsurface drainage system is needed in the wetter areas. Properly managing crop residue and adding other organic material will help to maintain tilth and the organic matter content.

This soil is well suited to pasture. Rotation grazing, proper stocking rates, applications of fertilizer, and weed control will increase forage yields.

Woodland.—The potential productivity of this soil for sugar maple is moderate.

Dwellings.—Wetness is the main limitation, especially on sites for dwellings with basements. Grading so that surface water moves away from the dwellings, installing interceptor drains that divert water from the higher adjacent areas, and installing drains around footings and foundations will reduce the wetness.

Local roads and streets.—Wetness and the potential for frost action are the main limitations. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action. Raised fill material and a drainage system will reduce the wetness.

Septic tank absorption fields.—Wetness and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept runoff from the higher adjacent areas. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which effluent is absorbed.

Capability classification.—IIw

WmC—Willowemoc channery silt loam, 8 to 15 percent slopes. This soil is very deep, strongly sloping, and moderately well drained. It is on the top and sides of hills and ridges in the Catskill Mountains. It formed in glacial till derived from reddish sandstone, siltstone, and shale. Areas are broad and range from 5 to 100 acres in size.

Typically, the surface is covered by 1 inch of leaf litter. The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 6 inches, dark reddish brown channery silt loam that has 25 percent rock fragments

Subsoil:
- 6 to 14 inches, reddish brown channery loam that has 20 percent rock fragments
- 14 to 18 inches, reddish brown channery loam that has brown and strong brown mottles and 20 percent rock fragments
- 18 to 21 inches, reddish brown channery loam that has strong brown mottles and 20 percent rock fragments
- 21 to 60 inches, a fragipan of reddish brown, very firm and brittle channery loam that has 30 percent rock fragments

Inclusions.—Included with this soil in mapping are small areas of the somewhat poorly drained Lewbeach and poorly drained and very poorly drained Suny soils in drainageways and depressions. Also included are areas of the moderately deep Vly and shallow Halcott soils on side slopes, areas that have stones on the surface, and eroded areas. Included areas are as much as 3 acres each in size and make up 15 to 25 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and the upper part of the subsoil and slow or very slow in the fragipan
Available water capacity: Moderate
Soil reaction: Extremely acid to strongly acid throughout the profile
Depth to the seasonal high water table: 1.5 to 2.5 feet (October through May)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Medium
Erosion hazard: Moderate

Use.—Most areas of this soil are used as hayland or pasture. A few areas are used for cultivated crops.

Crops and pasture.—This soil is moderately suited to cultivated crops. Erosion is the main hazard. Wetness delays planting in years of high rainfall. A conservation tillage system that leaves crop residue on the surface after planting and contour farming or stripcropping will reduce the hazard of erosion. A subsurface drainage system is needed in the wetter areas. Properly managing crop residue and adding other organic material will help to maintain tilth and the organic matter content.

This soil is well suited to pasture. Rotation grazing, proper stocking rates, applications of fertilizer, and weed control will increase forage yields.

Woodland.—The potential productivity of this soil for sugar maple is moderately high.

Dwellings.—Wetness is the main limitation, especially on sites for dwellings with basements. Grading so that surface water moves away from the dwellings, installing interceptor drains that divert water from the higher

adjacent areas, and installing drains around footings and foundations will reduce the wetness. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—Wetness, the slope, and the potential for frost action are the main limitations. A coarse grained subgrade or base material to frost depth will reduce the potential for frost action. Raised fill material and a drainage system will reduce the wetness. Land shaping or grading and special design will help to overcome the slope.

Septic tank absorption fields.—Wetness and the restricted permeability are the main limitations. A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept runoff from the higher adjacent areas. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which effluent is absorbed.

Capability classification.—IIIe

WmD—Willowemoc channery silt loam, 15 to 25 percent slopes. This soil is very deep, moderately steep, and moderately well drained. It is on the sides of hills and ridges in the Catskill Mountains. It formed in glacial till derived from reddish sandstone, siltstone, and shale. Areas are irregular in shape and range from 3 to 75 acres in size.

Typically, the surface is covered by 1 inch of leaf litter. The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 6 inches, dark reddish brown channery silt loam that has 25 percent rock fragments

Subsoil:
- 6 to 14 inches, reddish brown channery loam that has 20 percent rock fragments
- 14 to 18 inches, reddish brown channery loam that has brown and strong brown mottles and 20 percent rock fragments
- 18 to 21 inches, reddish brown channery loam that has strong brown mottles and 20 percent rock fragments
- 21 to 60 inches, a fragipan of reddish brown, very firm and brittle channery loam that has 30 percent rock fragments

Inclusions.—Included with this soil in mapping are small areas of the somewhat poorly drained Lewbeach and poorly drained and very poorly drained Suny soils in drainageways and depressions. Also included are areas of the moderately deep Vly and shallow Halcott soils on side slopes, areas that have stones on the surface, and eroded areas. Included areas are as much as 3 acres each in size and make up 15 to 25 percent of the unit.

Major soil properties—

Permeability: Moderate in the surface layer and the upper part of the subsoil and slow or very slow in the fragipan
Available water capacity: Moderate
Soil reaction: Extremely acid to strongly acid throughout the profile
Depth to the seasonal high water table: 1.5 to 2.5 feet (October through May)
Flooding: None
Depth to bedrock: More than 60 inches
Surface runoff: Rapid
Erosion hazard: Severe

Use.—Most areas of this soil are used as hayland or pasture. A few areas are used for cultivated crops.

Crops and pasture.—This soil is poorly suited to cultivated crops. The hazard of erosion and the slope are the main management concerns. Wetness delays planting in years of high rainfall. A conservation tillage system that leaves crop residue on the surface after planting, contour farming or stripcropping, and a crop rotation dominated by close-growing crops will reduce the hazard of erosion. A subsurface drainage system is needed in the wetter areas. Properly managing crop residue and adding other organic material will help to maintain tilth and the organic matter content.

This soil is moderately suited to pasture. Erosion is a hazard. Deferment of grazing during wet periods and controlled grazing will help to control erosion. Rotation grazing, proper stocking rates, applications of fertilizer, and weed control will increase forage yields.

Woodland.—The potential productivity of this soil for sugar maple is moderately high. The slope limits the use of equipment.

Dwellings.—Wetness and the slope are the main limitations, especially on sites for dwellings with basements. Grading so that surface water moves away from the dwellings, installing interceptor drains that divert water from the higher adjacent areas, and installing drains around footings and foundations will reduce the wetness. Special design will help to overcome the slope. Maintaining the plant cover and using temporary erosion-control structures will help to prevent excessive soil loss on construction sites.

Local roads and streets.—The slope is the main limitation. Land shaping or grading and special design will help to overcome this limitation.

Septic tank absorption fields.—Wetness, the slope, and the restricted permeability are the main limitations.

A drainage system around the absorption fields will reduce the wetness. It should include diversions, which can intercept runoff from the higher adjacent areas. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which effluent is absorbed. Installing the distribution lines on the contour and providing drop boxes or similar structures will increase the efficiency of the system.

Capability classification.—IVe

Prime Farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is the land that is best suited to food, feed, forage, fiber, and oilseed crops. It may be cultivated land, pasture, woodland, or other land, but it is not urban or built-up land or water areas. It either is used for food or fiber crops or is available for those crops. The soil qualities, growing season, and moisture supply are those needed for a well managed soil to produce a sustained high yield of crops in an economic manner. Prime farmland produces the highest yields with minimal expenditure of energy and economic resources, and farming it results in the least damage to the environment.

Prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The level of acidity or alkalinity is acceptable. Prime farmland has few or no rocks and is permeable to water and air. It is not excessively erodible or saturated with water for long periods and is not frequently flooded during the growing season. The slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Soil Conservation Service.

The survey area has about 24,910 acres of prime farmland. That acreage makes up about 6 percent of the total acreage in the survey area. It is mainly in the Catskill and Cauterskill Valleys and on the plains adjacent to the Hudson River Valley. About 35 percent of the prime farmland is woodland. The rest is used mainly for crops or pasture.

The map units in the survey area that are considered prime farmland are listed in table 5. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps at the back of this publication. The soil qualities that affect use and management are described under the heading "Detailed Soil Map Units."

Some soils that have a seasonal high water table qualify for prime farmland only in areas where this limitation has been overcome by drainage measures. The need for these measures is indicated after the map unit name in table 5. Onsite evaluation is needed to determine whether or not this limitation has been overcome by corrective measures.

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

General management needed for crops and pasture is suggested in this section. The system of land capability classification used by the Soil Conservation Service is explained, and the estimated yields of the main crops are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed Soil Map Units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

Farmland made up about 63,598 acres in Greene County in 1982. Of that acreage, 31,646 acres was cropland *(13)*.

The potential for increased crop production is good in several parts of the county. An example is the lake-laid area on the east side of the county, parallel to the Hudson River. This areas has soils with a high content of clay. If well managed, these soils can produce high yields. The low elevation results in a longer growing season and more growing degree days for mature crops.

Although farmed in only a few spots, the valleys along the Cauterskill, Catskill, Batavia Kill, East and West Kill, and Schoharie Creek have good cropland, both at the lower elevations and in the mountains. Much of the acreage is idle land, pasture, or woodland that could be used for high-yield cropping.

Information about suitable management practices for the soils in the county is available at the offices of the Greene County Soil and Water Conservation District and the Cooperative Extension Service.

Water erosion is a major hazard on nearly half of the cropland in the county *(13)*. The hazard of erosion is related to the length and degree of slope, the erodibility of the soil, the amount and intensity of rainfall, and the type of plant cover. Accelerated erosion results in the loss of plant nutrients and soil moisture, the formation of rills and gullies, deterioration of tilth, excessive sedimentation in downstream areas, and the pollution of streams and reservoirs.

Soil productivity decreases when the surface layer is lost and increasing amounts of subsoil are incorporated into the plow layer, especially in areas of soils that have a fine textured or very fine textured subsoil, such as Hudson and Rhinebeck soils, and soils that have root-

restricting layers, such as Lackawanna and Wellsboro soils. Soils that are shallow to bedrock, such as Nassau and Farmington soils, are irreparably damaged as a result of erosion.

Conservation practices provide a protective cover, reduce the runoff rate, and increase the rate of water infiltration. A combination of practices is generally needed to control erosion. Minimum tillage, no-till farming, cover crops, and crop rotations that include grasses and legumes are effective on soils that have short, uneven slopes, such as Nassau, Tunkhannock, and Chenango soils. Contour farming, stripcropping, and terraces are more effective on soils that have long, uniform slopes, such as Nunda, Mardin, and Valois soils.

Erosion control is generally needed on soils that have slopes of more than 3 percent. Soils that have a high content of silt and few coarse fragments, such as Hudson and Vergennes soils, are highly susceptible to water erosion.

Wind erosion is a hazard in areas of organic soils that have been cleared and drained, such as Carlisle soils. Windbreaks and a drainage or irrigation system will reduce this hazard.

The effectiveness of a particular combination of conservation practices varies from soil to soil. Moreover, different combinations can be equally effective in some areas.

Seasonal wetness may delay planting or cause crop damage in areas of the somewhat poorly drained, poorly drained, and very poorly drained soils in the county. The very poorly drained soils, such as Alden, Canandaigua, Carlisle, Lyons, and Wayland soils, are generally so wet that production of the commonly grown crops requires extensive drainage systems.

A drainage system has been installed in some areas of the somewhat poorly drained soils that are used for agricultural purposes. Continued maintenance of the drainage system is needed on these soils. In some areas supplemental drainage systems are needed. In areas where a drainage system has not been installed, properly spaced subsurface drains will reduce wetness.

Included with some well drained and moderately well drained soils, such as Nunda, Mardin, Chautauqua, Hudson, and Vergennes soils, in mapping are small areas of wetter soils that require random subsurface drains to make management of individual fields more uniform.

Rhinebeck, Morris, Busti, Volusia, and Onteora soils are in sloping areas but are seasonally wet. Interceptor drains that divert runoff and seepage will reduce the wetness.

The design of drainage systems varies with the kind of soil. A combination of surface and subsurface drainage systems is needed on most poorly drained and very poorly drained soils. These systems include open ditches, grassed waterways, and land smoothing and bedding, which improve surface drainage. Suitable natural outlets are commonly not available, especially in the areas of very poorly drained soils.

Drains should be more closely spaced in slowly permeable soils than in the more rapidly permeable soils. Subsurface drainage is slow in Burdett, Madalin, and Rhinebeck soils, for example. These soils may also require measures that improve surface drainage.

Surface stones, boulders, and rock outcrops severely limit the use of the soil as cropland or pasture in many areas. They interfere with the use of equipment. Some very stony and very bouldery soils, such as some areas of Nunda and Burdett soils, are better suited to permanent pasture than to cultivated crops. Applying fertilizer, reseeding, and mowing are difficult in pastured areas of those soils.

Removing the larger stones and boulders from some soils that have few additional limitations may be feasible. Overcoming limitations in areas of rock outcrop, however, is generally not feasible. Arnot-Lordstown channery silt loams, 15 to 35 percent slopes, very rocky, is an example of such an area.

Available water capacity is an important factor affecting crop growth. Some soils in the county tend to be droughty. Sandy and gravelly soils, soils that have a restricting layer, and soils that are shallow or moderately deep over bedrock tend to have a fairly low available water capacity. The gravelly Chenango soils and the shallow Nassau and Arnot soils have a low or very low available water capacity. Maintaining or increasing the content of organic matter and improving soil structure increase the available water capacity of these droughty soils. Green manure crops, crop residue, and manure increase the content of organic matter and improve structure.

Soil tilth is an important factor affecting the emergence of seedlings, the infiltration of water, and the ease of cultivation. Soils with good tilth generally have granular structure and are porous. The soils can be kept granular and porous by cultivating at the proper moisture content; by including sod crops, green manure crops, or cover crops in the crop rotation; and by properly managing crop residue or adding manure.

Tillage operations can influence tilth. Excessive tillage tends to reduce the content of organic matter and break down soil structure. Riverhead, Chenango, and other soils that are deep, well drained or somewhat excessively drained, and coarse textured or moderately coarse textured can be tilled throughout a wide range in moisture content without deterioration of tilth. Tilling the wetter and finer textured soils, such as Hudson,

Rhinebeck, and Madalin soils, at the proper moisture content helps to prevent deterioration of soil structure. Tilling when these soils are wet results in puddling and in the formation of a hard surface crust and clods as the soils dry.

The soils in the county require lime or fertilizer for optimum crop production, and some require both. The amount needed depends on the natural content of lime and plant nutrients, on the needs of the particular crop, and on the desired level of yields.

The content of organic matter is an important factor affecting fertility. Poorly drained and very poorly drained soils that have a dark surface layer, such as Madalin and Canandaigua soils, have a high content of organic matter. The lighter colored Lackawanna and Valois soils have a lower content of organic matter. Carlisle soils formed entirely in organic matter and are dark throughout.

Nitrogen is released from the organic matter, but much of it is in complex forms that cannot be used by plants until it is decomposed by micro-organisms. Nitrogen fertilizer is needed to supplement the nitrogen available from the organic matter in the soil. Measures that build up the supply of organic matter, such green manure crops, sod crops, and crop residue management, increase the content of nitrogen.

The content of phosphorus generally is low in the soils of Greene County. It tends to be very low in coarse textured soils, such as Tunkhannock and Chenango soils. Additions of the appropriate amounts of phosphate in the form of commercial fertilizer are essential in areas used for crops.

Most of the soils in the county are low or medium in content of available potassium. The content is somewhat higher, however, in Hudson, Rhinebeck, and Madalin soils, which have a clayey subsoil. Even soils that have a fairly high content of potassium require additional potassium for the optimum yields of most crops.

Lime is needed on most of the soils in the county to raise the pH to an acceptable level for the optimum yields of most crops.

New research findings and fertilizer recommendations can be obtained from the staff of the New York State College of Agriculture, Cornell University.

Yields Per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification of each map unit also is shown in the table.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops *(11)*. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and

narrower choices for practical use. The classes are defined as follows:

Class I soils have slight limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c,* used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation.

The acreage of soils in each capability class and subclass is shown in table 7. The capability classification of each map unit is given in the section "Detailed Soil Map Units" and in the yields table.

Woodland Management and Productivity

Gerald Andritz, New York State Department of Environmental Conservation, helped prepare this section.

In 1980, commercial forest made up about 252,300 acres, or 60 percent, of Greene County *(5)*. The acreage of commercial forest increased by about 7 percent between 1968 and 1980.

Northern hardwoods cover the greatest area in the county, approximately 155,300 acres. Oaks cover approximately 39,400 acres, and predominantly softwood types cover approximately 57,600 acres. The oak types are generally on the drier sites on southern and western aspects and on ridgetops. The northern hardwood type (beech, birch, and maple) is more common on the moister sites and on northern and eastern aspects. The softwood types, such as hemlock, are mainly on wet sites, such as along wetlands or drainageways or on the lower third of slopes. White pine grows on a wide variety of soils but is more common on well drained soils and in old agricultural fields.

The total volume of sawtimber in Greene County was about 677 million board feet in 1980. The volume increased by about 42 percent between 1968 and 1980, mainly as a result of the maturing of the forest stands. Maples produced approximately 201 million board feet; other hardwoods, 128 million board feet; oaks, 95 million board feet; white pine, 179 million board feet; hemlock, 47 million board feet; and other softwoods, 26 million board feet.

Woodland is throughout Greene County but is mainly in the western half of the county, particularly at the higher elevations and in the hills leading up to the Catskills. Wooded areas were traditionally the steepest, most inaccessible parts of the old farmsteads. Additionally, many of the older farms on marginal land have reverted back to woodland.

Table 8 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed in the tables. The table gives the ordination symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol,* a number, indicates the potential productivity of the soils for an indicator tree species. The number indicates the volume, in cubic meters per hectare per year, that the indicator species can produce. The larger the number, the greater the potential productivity. The number 1 indicates low productivity; 2 and 3, moderate; 4 and 5, moderately high; 6 to 8, high; 9 to 11, very high; and 12 or more, extremely high. The second part of the symbol, a letter, indicates the major kind of soil limitation for use and management. The letter *R* indicates steep slopes; *W,* excess water in or on the soil; *D,* restricted rooting depth caused by bedrock, a hardpan, or other restrictive layers; *S,* sandy texture; *F,* high content of rock fragments in the soil; and *L,* low strength. The letter *A* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: R, W, D, S, F, and L.

In table 8, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Erosion hazard is the probability that erosion can occur as a result of site preparation or cutting where the soil is exposed along roads, skid trails, and fire lanes and in log-handling areas. Forests that have been burned or overgrazed are also subject to erosion. Ratings of the erosion hazard are based on the percent of the slope and on the erosion factor K shown in table 16. A rating of *slight* indicates that no particular prevention measures are needed under ordinary conditions. A rating of *moderate* indicates that erosion-control measures are needed in certain silvicultural activities. A rating of *severe* indicates that special precautions are needed to control erosion in most silvicultural activities. The proper construction and maintenance of roads, trails, landings, and fire lanes will reduce the erosion hazard.

Equipment limitation reflects the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. The chief characteristics and conditions considered in the ratings are slope, stones on the surface, rock outcrops, soil wetness, and texture of the surface layer. A rating of *slight* indicates that under normal conditions the kind of equipment and season of use are not significantly restricted by soil factors. If soil wetness is a factor, equipment use is restricted for a period of less than 2 months. A rating of *moderate* indicates that equipment use is moderately restricted because of one or more soil factors. If soil wetness is a factor, equipment use is restricted for 2 to 6 months. A rating of *severe* indicates that equipment use is severely restricted either as to the kind of equipment or the season of use. If soil wetness is a factor, equipment use is restricted for more than 6 months. Choosing the best suited equipment and deferring the use of harvesting and other equipment during wet periods help to overcome the equipment limitation.

Seedling mortality refers to the death of naturally occurring or planted tree seedlings, as influenced by the kinds of soil or topographic conditions. The factors considered in rating the soils for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, rooting depth, and aspect of the slope. A rating of *slight* indicates that under usual conditions the expected mortality is less than 25 percent. A rating of *moderate* indicates that the expected mortality is 25 to 50 percent. Extra precautions are advisable. A rating of *severe* indicates that the expected mortality is more than 50 percent. Extra precautions are important. Replanting may be necessary. Selection of special planting stock and special site preparation, such as bedding, furrowing, and a surface drainage system, can reduce the seedling mortality rate.

Windthrow hazard is the likelihood that trees will be uprooted by the wind because the soil is not deep enough for adequate root anchorage. The main restrictions that affect rooting are a seasonal high water table and the depth to bedrock, a fragipan, or other limiting layers. A rating of *slight* indicates that under normal conditions no trees are blown down by the wind. Strong winds may damage trees but do not uproot them. A rating of *moderate* indicates that a few trees can be blown down during periods when the soil is wet and winds are moderate or strong. A rating of *severe* indicates that many trees can be blown down during these periods. The use of special equipment that does not damage surficial root systems during partial cutting operations can reduce the hazard of windthrow. Care in thinning or not thinning at all also can reduce the hazard.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index.* This index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Some of the entries under site index are estimates because no data was available. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

The *productivity class*, a number, represents an expected volume produced by the most important trees. This number, expressed as cubic meters per hectare per year, indicates the amount of fiber produced in a fully stocked, even-aged, unmanaged stand. One cubic meter per hectare equals 14.3 cubic feet per acre.

The first species listed under *common trees* for a soil is the indicator species for that soil. This species is common in the survey area. It generally is the most productive species on the soil. The productivity class of the indicator species is the number in the ordination symbol.

Trees to plant are those that are suitable for commercial wood production on the soil.

Recreation

The soils of the survey area are rated in table 9 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered.

Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 9, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 9 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 12 and interpretations for dwellings without basements and for local roads and streets in table 11.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

Robert Myers, staff biologist, Soil Conservation Service, helped prepare this section.

Three wildlife habitat zones are in Greene County—the Hudson River Valley along the eastern edge of the county, the Appalachian Plateau in the north-central part of the county, and the Catskill Mountains in the western half of the county.

The fertile, rolling Hudson River Valley has small forests and a few wetlands along the Hudson River and its tributaries. It provides habitat for white-tailed deer, gray squirrel, cottontail rabbit, red fox, coyote, and a variety of songbirds. It has a growing population of wild turkey. Mink, muskrat, and migrating and nesting waterfowl are common.

Large areas of northern hardwoods and scattered idle fields of goldenrod, shrubs, and immature trees are on the Appalachian Plateau. The land use pattern results in good habitat for white-tailed deer, ruffed grouse, wild turkey, gray squirrel, cottontail rabbit, red fox, gray fox, coyote, and a variety of songbirds.

The Catskill Mountains are steep and heavily forested with mature northern hardwoods mixed with spruce, fir, and hemlock. A large acreage in these mountains is in the state's forest preserve. Cutting of trees is not permitted in the preserve. Thus, the preserve has extensive areas of mature forests with little understory to provide food and cover for wildlife. The combination of extensive mature forest and few people in some areas results in a wilderness habitat for black bear and bobcat. On private land and in areas where timber has been harvested, some diversity of habitat occurs, creating conditions suitable for deer, wild turkey, grouse, coyote, gray fox, and gray squirrel and a few cottontail rabbits and otters. Forest community species of songbirds are throughout the mountains.

Snowshoe hare inhabit the spruce-fir forest communities.

Beaver, raccoon, and striped skunk are common throughout the county, and opossum are in all areas, except for the high peaks in the Catskill Mountains.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 10, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flooding, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, lovegrass, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggartick, quackgrass, and ragweed.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, birch, cherry, maple, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are gray dogwood, autumn olive, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, yew, cedar, and hemlock.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, arrowhead, pickerelweed, cordgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, swamps, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include bobwhite quail, meadow vole,

meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, ruffed grouse, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, and deer.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, frogs, and tree swallow.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the "Glossary."

Building Site Development

Table 11 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is

affected by soil texture and depth to the water table.

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, slope, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 12 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 12 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 12 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table,

depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. Ease of excavation and revegetation should be considered.

The ratings in table 12 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to wind erosion.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 13 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and depth to the water table is less than 1 foot. These soils may have layers of suitable material, but the material is less than 3 feet thick.

Sand and *gravel* are natural aggregates suitable for

commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 13, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal high water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its content of organic matter. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 14 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed excavated ponds. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a

permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and quality of the water as inferred from the salinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and the potential for frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics. These results are reported in table 18.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 15 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as about 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the "Glossary."

Classification of the soils is determined according to the Unified soil classification system *(2)* and the system adopted by the American Association of State Highway and Transportation Officials *(1)*.

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The AASHTO classification for soils tested, with group index numbers in parentheses, is given in table 18.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates

determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 16 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil *(4)*. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at ⅓ bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is commonly needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change

of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indica tes the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 16, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 17 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

Soils in table 17 may be assigned to two hydrologic soil groups. Dual grouping is used for one of two reasons. Some soils have a seasonal high water table but can be drained. In this instance, the first letter is for drained areas and the second is for undrained areas. For some soils that are less than 20 inches deep over bedrock, the first letter is for areas where the bedrock is cracked and pervious and the second is for areas where the bedrock is impervious or where exposed bedrock makes up more than 25 percent of the surface.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary covering of the soil surface by flowing water, is caused by overflowing streams, by runoff from adjacent slopes, or by inflow from high tides. Shallow water standing or flowing for short periods after rainfall or snowmelt is not considered flooding. Standing water in swamps and marshes or in a closed depression is considered ponding.

Table 17 gives the frequency and duration of flooding and the time of year when flooding is most likely to occur.

Frequency, duration, and probable period of occurrence are estimated. Frequency generally is expressed as *none, rare, occasional,* or *frequent. None* means that flooding is not probable. *Rare* means that flooding is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year). *Occasional* means that flooding occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year). *Frequent* means that flooding occurs often under normal weather conditions (the chance of flooding is more than 50 percent in any year). Duration is expressed as *very brief* (less than 2 days), *brief* (2 to 7 days), *long* (7 days to 1 month), and *very long* (more than 1 month). The time of year that floods are most likely to occur is expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information on flooding is based on evidence in the soil profile, namely, thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons that are characteristic of

soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely, grayish colors or mottles in the soil. Indicated in table 17 are the depth to the seasonal high water table; the kind of water table, that is, perched or apparent; and the months of the year that the water table commonly is highest. A water table that is seasonally high for less than 1 month is not indicated in table 17.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Two numbers in the column showing depth to the water table indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. "More than 6.0" indicates that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Engineering Index Test Data

Table 18 shows laboratory test data for several pedons sampled at carefully selected sites in the survey area. The pedons are representative of the series described in the section "Soil Series and Their Morphology." The soil samples were tested by the New York State Department of Transportation.

The testing methods generally are those of the American Association of State Highway and Transportation Officials (AASHTO) or the American Society for Testing and Materials (ASTM).

The tests and methods are AASHTO classification—M 145 (AASHTO), D 3282 (ASTM); Unified classification—D 2487 (ASTM); Liquid limit—T 89 (AASHTO), D 423 (ASTM); Plasticity index—T 90 (AASHTO), D 424 (ASTM); Moisture density, Method A—T 99 (AASHTO), D 698 (ASTM); and Shrinkage—T 92 (AASHTO), D 427 (ASTM).

Engineering Properties of Geologic Deposits

Edward Fernau, senior soil engineer, New York State Department of Transportation, Soil Mechanics Bureau, prepared this section.

The following geologic deposits are in Greene County—glacial till, outwash, and ice-contact,

lacustrine, alluvial, and organic material. The engineering significance of each geologic deposit is influenced to a great extent by its mode of deposition, which in turn determines the texture of the material and the internal structure of the landform. Other influences are the position on the landscape and depth to the water table. In Greene County the geologic deposits are divided into the following categories—deep till, deposits that are shallow or moderately deep to bedrock, stratified coarse grained deposits, stratified fine grained deposits, and organic deposits.

Deep Till Deposits

Deep till deposits are unstratified, highly variable mixtures of all particle sizes ranging from rock fragments to clay. This material was scoured and transported from nearby sources by glacial ice and deposited as ground moraines or end moraines. Bedrock is generally more than 5 feet below the surface, but in some small areas the bedrock is within a depth of 5 feet or a few rock outcrops occur. The individual rock and mineral fragments in the soil generally reflect the types of bedrock in the immediate area.

Alden, Burdett, Busti, Chautauqua, Elka, Lackawanna, Lewbeach, Lyons, Mardin, Morris, Nunda, Onteora, Suny, Valois, Volusia, Wellsboro, and Willowemoc soils formed in mixed deep till deposits. These soils are the most dense and compact of the unconsolidated deposits in the county. Most of the tills have been compacted by the weight of glacial ice. Deep soils that formed in till are on slopes ranging from nearly level to very steep, but most are nearly level or gently sloping. In many areas cut and fill earthwork is involved in most kinds of construction. The soils generally provide stable, relatively incompressible foundations for engineering works. When properly compacted, fill material from these deposits generally provides stable embankments. Steep cut slopes commonly are subject to sloughing and erosion. Alden and Lyons soils are subject to ponding.

Deposits That Are Shallow or Moderately Deep to Bedrock

These deposits are a veneer over bedrock. The soil is generally as much as 40 inches deep, but rock outcrops are common in some areas. The landforms and topography are generally controlled by the bedrock.

Arnot, Halcott, Lordstown, Oquaga, Tor, Tuller, and Vly soils formed in glacial till over bedded sandstone, siltstone, and shale. Nassau soils formed over shale, and Farmington and Galway soils formed over limestone.

The primary engineering concerns in areas of these soils relate to the underlying bedrock and ground-water conditions. Other engineering considerations are similar to those described for the overlying material. Fill material is limited in quantity because of the limited depth to bedrock.

Stratified Coarse Grained Deposits

These materials are dominated by gravel and sand that have been sorted by glacial meltwater into layered or stratified deposits, but the coarser textured material deposited by fluvial action also is included. The soils are on such geologic landforms as lateral moraines, outwash plains and terraces, ice-contact kames and eskers, beach ridges, and the coarser textured areas of deltas, lacustrine plains, and flood plains. The strata within these deposits may be well sorted or poorly sorted and may have particle sizes ranging from cobbles to silt. The deposits are generally loose and porous and are moderately rapidly permeable or rapidly permeable.

Chenango, Riverhead, and Tunkhannock soils formed on gravelly outwash plains and terraces, beach ridges, deltas, kames, and eskers. Maplecrest soils formed in glacial till over coarse grained material. Barbour, Basher, Middlebury, Tioga, and Wayland soils formed in deposits on flood plains.

Coarse grained deposits generally have relatively high strength and low compressibility. Because of their loose and porous nature, most of these deposits are not highly erodible but are subject to settlement when vibrated. Barbour, Basher, Middlebury, Tioga, and Wayland soils are subject to flooding.

Depending on gradation, soundness, and plasticity, the deposits of sand and gravel can be used as sources for many kinds of construction material, including fill material for highway embankments, parking areas, and developments; fill material that decreases stress on the underlying soils so that construction operations may progress; subbase for pavements; wearing surfaces for driveways, parking lots, and some roads; material for highway shoulders; free draining backfill for structures and pipes; shells of dams; slope protection blankets that drain and help to stabilize wet cut slopes; and sand and gravel for general uses.

Stratified Fine Grained Deposits

These deposits consist of lacustrine, fine grained sediments transported by glacial meltwater and deposited in quiet proglacial lakes and ponds. Some occur as soils on flood plains in areas of the more recent slack-water deposits. Distinct layers or

laminations of generally fine sand, silt, and clay particles are common.

Covington, Hudson, Kingsbury, Madalin, Rhinebeck, and Vergennes soils formed in thick deposits of lake-laid silt and clay. Canandaigua soils formed in thick deposits of silty material on deltas. Elmridge and Shaker soils formed in a medium grained veneer over fine grained material.

Because of their finer texture and higher moisture content, these deposits have lower strength than other deposits in the county. The soils that have a high content of fine sand and silt have low compressibility but are highly erodible and susceptible to frost.

The fine grained deposits are difficult to use for engineering works, especially where the soils are nearly level, wet, and subject to ponding. Sites for embankments and heavy structures or buildings on all of the soils that formed in these sediments should be investigated for strength and settlement characteristics and the effects of ground water.

Organic Deposits

Organic deposits generally are accumulations of plant remains. In places they include a minimal amount of mineral soil. They are in very poorly drained depressions and bogs covered with water during most of the year or are in areas of marsh.

Carlisle soils and Medisaprists formed in organic material, and Hydraquents are in tidal marsh areas. The soils that formed in organic deposits are unsuitable as sites for the foundations of engineering works because they are wet, weak, and highly compressible. Generally, the organic material should be removed and replaced with suitable backfill. Filling over organic deposits causes long-term settlement.

Relationship Between Soil Series and Their Parent Material, Landscape Position, and Drainage

In table 19 the soils in the county are grouped according to a number of factors. The first of these factors is the type of parent material in which the soils formed. The types of parent material in the county are glacial till, outwash, lacustrine deposits, alluvial deposits, and organic material. Soils that formed in similar kinds of parent material are grouped according to their depth to bedrock. The soils are further grouped on the basis of the texture and morphology of the parent material. For some soils the kinds of parent material and depth to bedrock are similar, but the mean annual soil temperature varies. These soils are divided into two classes—frigid and mesic. Lackawanna and Lewbeach soils are examples. Lackawanna soils are mesic, and Lewbeach soils are frigid. Finally, the soils are assigned to drainage classes. Soils having the same kind of parent material, depth, and landscape position but differing in drainage class form a soil catena. Hudson, Rhinebeck, and Madalin soils are an example. Some soils are in more than one drainage class. Tuller soils are an example.

Table 19 supplements the sections "Formation of the Soils" and "Engineering Properties of Geologic Deposits." Detailed information about the morphology and character of each soil is given in the section "Soil Series and Their Morphology."

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(12)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 20 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Eleven soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Inceptisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquept (*Aqu*, meaning water, plus *ept*, from Inceptisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Haplaquepts (*Hapl*, meaning minimal horizonation, plus *aquept*, the suborder of the Inceptisols that has an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Aeric* identifies the subgroup that is better drained than is typical for the great group. An example is Aeric Haplaquepts.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is coarse-loamy over clayey, mixed, nonacid, mesic Aeric Haplaquepts.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" *(10)*. Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" *(12)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Alden Series

The Alden series consists of very deep, poorly drained and very poorly drained soils on flats and in

depressional areas on till plains. These soils formed in loamy glacial till and an 18-to-40-inch-thick mantle washed from the adjacent areas. Slope ranges from 0 to 3 percent.

Alden soils are associated with the poorly drained and very poorly drained Canandaigua soils on similar depressional landscapes. Canandaigua soils are finer textured than Alden soils. Alden soils are near Wayland soils. Unlike those soils, they do not have an irregular distribution of organic matter with increasing depth and are not on flood plains.

Typical pedon of Alden silt loam, in a pasture in Greenville, 50 feet south of Plattekill Road and 650 feet west of Foxhill Road:

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine granular structure; very friable; many medium and fine roots; many medium pores; 4 percent rock fragments; neutral; clear smooth boundary.

Bg1—9 to 14 inches; dark grayish brown (2.5Y 4/2) silt loam; few fine distinct light yellowish brown (2.5Y 6/4) mottles; weak fine subangular blocky structure; friable; few fine roots; many medium pores; 10 percent rock fragments; neutral; gradual wavy boundary.

Bg2—14 to 24 inches; grayish brown (2.5Y 5/2) channery silt loam; common medium prominent yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; many medium roots; 15 percent rock fragments; neutral; clear wavy boundary.

Bg3—24 to 35 inches; grayish brown (2.5Y 4/2) silt loam; few fine and medium prominent yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure breaking to moderate medium subangular blocky; friable; few medium roots; 10 percent rock fragments; slightly acid; gradual wavy boundary.

Cg—35 to 60 inches; grayish brown (2.5Y 5/2) channery silt loam; common medium prominent brownish yellow (10YR 6/6) mottles; weak thick platy structure; firm; few fine roots; 15 percent rock fragments; slightly acid.

The thickness of the solum ranges from 20 to 36 inches. The content of rock fragments ranges from 0 to 15 percent in the solum and from 5 to 35 percent in the C horizon. Some pedons have an O horizon, which is 2 to 6 inches thick. The depth to bedrock is more than 60 inches.

The A horizon has hue of 10YR or 2.5Y or is neutral in hue. It has value of 2 or 3 and chroma of 0 to 2. It ranges from fine sandy loam to silt loam in the fine-earth fraction. It has weak or moderate, fine or medium granular structure and is friable or very friable. Reaction ranges from strongly acid to neutral.

The Bg horizon has hue of 5YR to 2.5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 2. Mottles in this horizon are few to many and distinct or prominent. The horizon ranges from very fine sandy loam or silt loam to silty clay loam in the fine-earth fraction. It has moderate or weak, fine or medium, subangular blocky or platy structure. Consistence is friable or firm. Reaction ranges from moderately acid to neutral.

The C horizon has hue of 5YR to 5Y or is neutral in hue. It has value of 3 to 5 and chroma of 0 to 3. Mottles in this horizon are few to many and faint to prominent. The texture is fine sandy loam, loam, silt loam, or silty clay loam in the fine-earth fraction. The horizon is massive or has weak platy structure. Consistence is firm. Reaction ranges from slightly acid to mildly alkaline to a depth of 40 inches and from slightly acid to moderately alkaline below that depth. In some pedons free carbonates are at a depth of more than 40 inches.

Arnot Series

The Arnot series consists of shallow, somewhat excessively drained to moderately well drained soils. These soils formed in channery, acid glacial till that is 10 to 20 inches deep over sandstone or shale. They are on plateaus, benches, and hilltops in the uplands and on valley sides where the topography is influenced by the underlying bedrock. In places the topography is rolling. Slope ranges from 0 to 55 percent.

Arnot soils are in a drainage sequence with the somewhat poorly drained and poorly drained Tuller soils. Arnot soils are near Lordstown, Oquaga, Valois, and Lackawanna soils. They are shallower to bedrock than those soils. Arnot soils are similar to Farmington and Nassau soils but have a higher content of coarse fragments than Farmington soils and do not have the folded shale and slate typical of Nassau soils.

Typical pedon of Arnot channery silt loam, in an area of Arnot-Oquaga complex, rolling; in an abandoned hayfield in Cairo, 50 feet north of Joseph Chadderdon Road and 2,200 feet west of County Route 31:

A—0 to 1 inch; dark reddish brown (5YR 3/2) channery silt loam; weak fine granular structure; very friable; many roots; 34 percent rock fragments; very strongly acid; abrupt smooth boundary.

Bw—1 to 12 inches; reddish brown (2.5YR 4/4) very channery silt loam; weak medium subangular blocky

structure; friable; common roots; few medium pores; 55 percent rock fragments; strongly acid; abrupt smooth boundary.

R—12 inches; weak red (2.5YR 4/2), fractured sandstone bedrock.

The thickness of the solum ranges from 10 to 20 inches and corresponds to the depth to bedrock. The content of rock fragments ranges from 35 to 70 percent in the control section. Reaction ranges from extremely acid to moderately acid. The texture of the fine-earth fraction is loam or silt loam.

The A horizon has hue of 5YR to 2.5Y, value of 2 to 4, and chroma of 2 or 3. It has weak or moderate fine granular structure and is very friable or friable.

The B horizon has hue of 2.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 6. Structure is weak, medium, and subangular blocky or granular. Consistence is friable or firm.

Barbour Series

The Barbour series consists of very deep, well drained soils on flood plains. These soils formed in alluvial deposits. Slope ranges from 0 to 3 percent.

Barbour soils, the moderately well drained Basher soils, and the poorly drained and very poorly drained Wayland soils formed in the same kinds of material and are in the same positions on the landscape. Barbour soils are associated with the gravelly Tunkhannock soils on nearby terraces and in other areas of outwash deposits and are near the very deep Lackawanna, Wellsboro, and Morris soils, all of which have a fragipan. Barbour soils also are near the well drained Tioga soils. They are redder than those soils and have a lower base status.

Typical pedon of Barbour loam, 0.4 mile southeast of the intersection of Beaches Corner Road and New York Route 296, in a hayfield in Jewett, 500 feet north of East Kill, 300 feet north of Beaches Corners:

Ap—0 to 9 inches; dark reddish brown (5YR 3/4) loam; weak fine granular structure; very friable; many fine and few medium roots; strongly acid; clear smooth boundary.

Bw1—9 to 15 inches; yellowish red (5YR 4/6) loam; weak fine and medium subangular blocky structure; friable; many fine roots; few fine tubular pores; strongly acid; clear smooth boundary.

Bw2—15 to 23 inches; dark reddish brown (5YR 3/4) fine sandy loam; weak thick platy structure parting to weak fine and medium subangular blocky; friable; common fine roots; few fine tubular pores; very strongly acid; clear wavy boundary.

Bw3—23 to 28 inches; dark reddish brown (5YR 3/4) and reddish brown (5YR 4/4) fine sandy loam; few fine faint yellowish red (5YR 5/8) mottles; weak medium platy structure parting to weak medium subangular blocky; friable; few fine roots; few fine tubular pores; strongly acid; abrupt smooth boundary.

2C1—28 to 37 inches; dark reddish brown (5YR 3/3) very gravelly coarse sand; single grained; loose; 44 percent rock fragments less than 1 inch long; strongly acid; gradual wavy boundary.

2C2—37 to 78 inches; dark reddish brown (5YR 3/3) very gravelly coarse sand; single grained; loose; 58 percent rock fragments; strongly acid.

The thickness of the solum ranges from 18 to 40 inches, and depth to the contrasting 2C horizon is 20 to 40 inches. The content of rock fragments ranges from 0 to 40 percent in the solum and from 0 to 60 percent in the substratum. In unlimed areas reaction ranges from very strongly acid to slightly acid in the substratum.

The A horizon has hue of 5YR to 7.5YR, value of 3 or 4, and chroma of 2 to 4. The texture is loam or silt loam in the fine-earth fraction. Structure is weak fine granular. Consistence is very friable or friable.

The Bw horizon has hue of 2.5YR to 7.5YR, value of 3 to 5, and chroma of 3 to 6. It is loam to fine sandy loam in the fine-earth fraction. Structure is weak and is fine to coarse subangular blocky or thick or medium platy parting to subangular blocky. Consistence is friable or very friable.

The 2C horizon has hue of 5YR to 7.5YR, value of 3 to 5, and chroma of 2 to 4. The texture is loamy sand, coarse sand, or sand in the fine-earth fraction.

Basher Series

The Basher series consists of very deep, moderately well drained soils on flood plains. These soils formed in alluvial sediments. Slope ranges from 0 to 3 percent.

Basher soils, the well drained Barbour soils, and the poorly drained and very poorly drained Wayland soils formed in the same kinds of material. Basher soils are associated on the landscape with the gravelly Tunkhannock soils, which formed in glacial outwash, and the very deep Lackawanna, Wellsboro, and Morris soils, all of which have a fragipan. Basher soils are in positions on flood plains similar to those of the moderately well drained and somewhat poorly drained Middlebury soils. They have a lower base status than those soils and are redder.

Typical pedon of Basher silt loam, in a meadow 0.5

mile east of New York Route 32 in Catskill, 2,000 feet north of Mt. Turnpike Road, on property line between Lasher Farm and Friar Tuck Resort:

Ap—0 to 8 inches; dark reddish brown (5YR 3/3) silt loam; weak fine granular structure; friable; many medium and fine roots; moderately acid; clear smooth boundary.

Bw1—8 to 14 inches; reddish brown (5YR 4/4) silt loam; weak fine and medium subangular blocky structure; friable; few fine roots; strongly acid; gradual wavy boundary.

Bw2—14 to 22 inches; reddish brown (5YR 5/4) silt loam; few fine distinct brown (7.5YR 5/2) and strong brown (7.5YR 5/6) mottles; moderate fine and medium subangular blocky structure; friable; strongly acid; gradual wavy boundary.

C1—22 to 43 inches; dark reddish brown (2.5YR 3/4) loam; few fine distinct reddish gray (5YR 5/2) and few fine prominent strong brown (7.5YR 5/6) mottles; weak medium platy structure; friable; strongly acid; gradual wavy boundary.

C2—43 to 60 inches; reddish gray (5YR 5/2) loam; few medium distinct pinkish gray (7.5YR 6/2) and brown (7.5YR 5/4) mottles; massive; friable; very strongly acid.

The thickness of the solum ranges from 20 to 36 inches. The depth to bedrock is more than 60 inches. The fine-earth fraction is mainly silt loam to fine sandy loam or loam, but layers as coarse as sand are below a depth of 40 inches in some pedons. Reaction is extremely acid to moderately acid in the A and B horizons and very strongly acid to slightly acid in the C horizon.

The Ap horizon has hue of 5YR to 7.5YR, value of 3 or 4, and chroma of 2 to 4. Structure is weak or moderate, medium or fine granular. Consistence is very friable or friable.

The Bw horizon has hue of 2.5YR to 7.5YR, value of 4 or 5, and chroma of 3 or 4. Structure is subangular blocky or granular. Consistence is friable or firm.

The C horizon has hue of 5YR to 2.5YR, value of 3 to 5, and chroma of 2 to 4. It is platy or massive. Consistence is friable or very friable.

Burdett Series

The Burdett series consists of very deep, somewhat poorly drained soils on till plains. These soils formed in two separate deposits of glacial till and are strongly influenced by shale. Slope ranges from 0 to 15 percent.

Burdett soils are in a drainage sequence with the moderately well drained Nunda soils and the poorly drained and very poorly drained Lyons soils. Burdett soils commonly are near the shallow Arnot and Tuller soils and moderately deep Lordstown soils in areas where the mantle of till is thinner.

Typical pedon of Burdett channery silt loam, 3 to 8 percent slopes, in Greenville, 1,300 feet south of the Albany County line and 440 feet east of the Durham town line:

Ap—0 to 9 inches; dark brown (10YR 3/3) channery silt loam, light gray (10YR 7/2) dry; weak fine granular structure; very friable; many roots; 25 percent rock fragments; strongly acid; abrupt smooth boundary.

E—9 to 15 inches; brown (10YR 5/3) channery silt loam; common fine faint dark yellowish brown (10YR 4/4) mottles; weak fine subangular blocky structure; friable; many roots; common pores; 25 percent rock fragments; moderately acid; clear wavy boundary.

E/B—15 to 20 inches; grayish brown (2.5Y 5/2) ped exteriors (E part) and dark brown (10YR 4/3) channery silt loam in ped interiors (B part); many medium prominent strong brown (7.5YR 5/8) and many medium distinct light gray (10YR 6/1) mottles; weak medium subangular blocky structure; friable; common roots; common pores; 20 percent rock fragments; slightly acid; clear irregular boundary.

2Bt—20 to 36 inches; brown (10YR 4/3) channery clay loam; common fine distinct yellowish brown (10YR 5/6) and common medium distinct light gray (10YR 6/1) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; firm; common distinct grayish brown (10YR 5/2) clay films on faces of peds; few roots; few pores; 20 percent rock fragments; neutral; gradual wavy boundary.

2C—36 to 60 inches; brown (10YR 4/3) channery loam; few fine distinct yellowish brown (10YR 5/6) and common medium prominent light gray (5Y 6/1) mottles; weak thick platy structure; firm; few roots; few pores; 20 percent rock fragments; neutral.

The thickness of the solum ranges from 30 to 50 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges from 5 to 25 percent in the upper part of the solum and from 10 to 35 percent in the lower part and in the C horizon. Reaction ranges from strongly acid to neutral in the solum and from slightly acid to moderately alkaline in the substratum. The depth to carbonates ranges from 30 to 72 inches.

The Ap horizon has hue of 10YR to 2.5Y and value

and chroma of 2 or 3. The texture is silt loam or very fine sandy loam in the fine-earth fraction.

The E horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2 to 4 and is mottled. It is silt loam or very fine sandy loam in the fine-earth fraction. Structure is weak or moderate, very fine to coarse subangular blocky. Consistence is very friable to firm.

The E/B horizon has hue of 10YR to 5Y, value of 5 or 6, and chroma of 2 or 3 on the ped exteriors. In the interiors, hue is 7.5YR to 2.5Y, value is 4 or 5, and chroma is 2 to 4. Mottles in this horizon are faint to prominent. The texture is silt loam or very fine sandy loam in the fine-earth fraction. Structure is moderate thick platy to weak coarse subangular blocky. Consistence is very friable to firm.

The 2Bt horizon has hue of 5YR to 5Y, value of 4 or 5, and chroma of mainly 2 to 4. Ped coatings have chroma of 2 or less. The texture is loam, clay loam, or silty clay loam in the fine-earth fraction. The content of clay ranges from 28 to 35 percent. Structure is weak or moderate coarse prismatic or coarse subangular blocky in the upper part and weak or moderate platy, blocky, or prismatic in the lower part. Consistence is firm or very firm.

The 2C horizon has colors similar to those of the 2Bt horizon. The texture is silt loam, loam, silty clay loam, clay loam, or sandy clay loam in the fine-earth fraction. The horizon has weak or moderate, thin to thick platy structure or is massive. Consistence is firm or very firm.

Busti Series

The Busti series consists of very deep, somewhat poorly drained soils on till plains. These soils formed in deposits of glacial till and are strongly influenced by shale and thinly bedded sandstone. Slope ranges from 3 to 8 percent.

Busti soils are in a drainage sequence with the moderately well drained Chautauqua soils and the well drained Valois soils. Busti soils commonly are near the shallow Arnot and Tuller soils and the moderately deep Lordstown soils in areas where the mantle of till is thinner.

Typical pedon of Busti silt loam, 3 to 8 percent slopes, in Greenville, 500 feet west of County Road 50 and 200 feet south of the Albany County line:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable; many fine and medium roots; 10 percent rock fragments; moderately acid; clear smooth boundary.

Bw1—8 to 14 inches; brown (10YR 5/3) channery silt loam; common medium distinct light olive brown (2.5Y 5/4) mottles; moderate fine subangular blocky structure; friable; many fine and medium roots; grayish brown (10YR 5/2) faces of peds; 15 percent rock fragments; moderately acid; clear wavy boundary.

Bw2—14 to 26 inches; dark brown (10YR 4/3) channery silt loam; few fine distinct grayish brown (10YR 5/2) mottles; grayish brown (10YR 5/2) ped interiors; weak fine subangular blocky structure; friable; 15 percent rock fragments; moderately acid; clear wavy boundary.

C—26 to 60 inches; dark brown (10YR 4/3) channery silt loam; few fine prominent dark grayish brown (2.5Y 4/2) mottles; massive; friable and firm; 25 percent rock fragments; slightly acid.

The thickness of the solum ranges from 20 to 40 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges from 5 to 15 percent in the A horizon, from 10 to 25 percent in the Bw horizon, and from 15 to 35 percent in the C horizon. In unlimed areas reaction is moderately acid or slightly acid throughout the profile.

The Ap horizon has hue of 7.5YR to 2.5Y, value of 3 or 4, and chroma of 2 or 3. It is silt loam or loam. Structure is weak or moderate, medium or fine, and subangular blocky or granular. Consistence is very friable or friable.

The Bw horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of mainly 2 to 4. It has distinct or prominent, high- and low-chroma mottles. Chroma on faces of peds ranges from 0 to 2. The horizon is silt loam or loam in the fine-earth fraction. Structure is weak or moderate, fine or medium subangular blocky. Consistence is friable or firm.

The C horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 2 to 4 and is mottled. It is silt loam or loam in the fine-earth fraction. It is massive. Consistence is friable or firm.

Canandaigua Series

The Canandaigua series consists of very deep, poorly drained and very poorly drained soils in depressional areas on glacial terraces and lake plains. These soils formed in lacustrine deposits. Slope ranges from 0 to 3 percent.

Canandaigua soils are near Burdett and Nunda soils, which have an argillic horizon, and the shallow, somewhat excessively drained to moderately well drained Arnot soils. Canandaigua soils are similar in texture to Wayland soils, which are on flood plains and have an irregular distribution of organic matter.

Typical pedon of Canandaigua silt loam, in Greenville, 0.5 mile north of Greenville Center and 100 yards west of County Road 41:

Ap—0 to 7 inches; very dark gray (10YR 3/1) silt loam, dark gray (10YR 4/1) dry; moderate fine and medium granular structure; very friable; many fine roots; neutral; abrupt smooth boundary.

Bg1—7 to 10 inches; gray (N 5/0) silt loam; common medium prominent strong brown (7.5YR 5/8) and grayish brown (2.5Y 5/2) mottles; moderate medium subangular blocky structure; friable; common fine roots; few fine pores; neutral; abrupt wavy boundary.

Bg2—10 to 33 inches; gray (10YR 5/1) silt loam; common coarse faint gray (10YR 6/1) and many coarse prominent strong brown (7.5YR 5/8) mottles; moderate coarse prismatic structure parting to weak medium subangular blocky; friable; few fine roots; common fine pores; 1 percent rock fragments; neutral; abrupt wavy boundary.

BCg—33 to 40 inches; grayish brown (2.5Y 5/2) silt loam; many medium distinct gray (N 6/0) and many coarse prominent strong brown (7.5YR 5/8) mottles; moderate coarse prismatic structure parting to weak medium subangular blocky; sticky; few roots; common fine pores; 1 percent rock fragments; neutral; slightly effervescent; abrupt wavy boundary.

Cg—40 to 60 inches; light gray (10YR 6/1) silt loam; common medium prominent strong brown (7.5YR 5/8) mottles; weak thick platy structure; sticky; few roots; common fine pores; 1 percent rock fragments; moderately alkaline; strongly effervescent.

The thickness of the solum ranges from 20 to 40 inches. The depth to free carbonates ranges from 18 to 60 inches. The content of rock fragments is as much as 10 percent in subhorizons in some pedons.

The Ap horizon has hue of 5YR to 2.5Y or is neutral in hue. It has value of 2 or 3 and chroma of 0 to 2. It is silt loam, very fine sandy loam, loam, or fine sandy loam. Structure is weak to strong, very fine to coarse, and granular or subangular blocky. Reaction ranges from moderately acid to mildly alkaline.

The Bg horizon has hue of 5YR to 2.5Y or is neutral in hue. It has value of 5 to 7. It has chroma of mainly 0 to 2, but more than 20 percent of the matrix has mottles with higher chroma. The horizon is silt loam, very fine sandy loam, or silty clay loam. Structure is weak to strong, very fine to coarse, subangular or angular blocky, either alone or within coarse or very coarse prisms. Consistence ranges from friable to very firm. Reaction ranges from slightly acid to mildly alkaline.

The Cg horizon has hue of 5YR to 5Y, value of 3 to 6, and chroma of 1 to 3, or it is neutral in hue. The texture ranges from fine sand to silty clay. Reaction ranges from neutral to moderately alkaline.

Carlisle Series

The Carlisle series consists of very deep, very poorly drained soils in swamps and marshes on glaciated uplands and outwash plains. These soils formed in accumulated organic matter derived from plant remains. A constant high water table inhibits oxidation of the remnants of mosses, sedges, and woody plants, causing the organic matter to accumulate. Slope is 0 to 1 percent.

Carlisle soils are near Canandaigua and Madalin soils and Medisaprists. Canandaigua and Madalin soils formed in mineral material at the borders of bogs. Medisaprists are in ponded areas at the center of the swamps and are influenced by tides and covered by water.

Typical pedon of Carlisle muck, east of County Route 17, about 3,500 feet north of Jewett:

Oa1—0 to 12 inches; muck, black (10YR 2/1) broken face and rubbed; about 20 percent fibers, 3 percent after rubbing; weak fine subangular blocky structure; nonsticky and nonplastic; slightly acid; gradual wavy boundary.

Oa2—12 to 35 inches; muck, very dark brown (10YR 2/2) broken face and rubbed; about 10 percent fibers, 1 percent after rubbing; weak medium subangular blocky structure; nonsticky and nonplastic; moderately acid; gradual wavy boundary.

Oa3—35 to 48 inches; muck, dark reddish brown (5YR 3/2) broken face, dark reddish brown (5YR 2.5/2) rubbed and pressed; about 15 percent fibers, 1 percent after rubbing; massive; nonsticky and nonplastic; moderately acid; clear wavy boundary.

Oa4—48 to 62 inches; muck, dark yellowish brown (10YR 4/4) broken face, very dark grayish brown (10YR 3/2) rubbed, dark yellowish brown (10YR 4/6) pressed; more than 50 percent fibers, about 25 percent after rubbing; massive; nonsticky and nonplastic; moderately acid; gradual wavy boundary.

Oa5—62 to 75 inches; muck, very dark grayish brown (10YR 3/2) broken face and rubbed; about 20 percent fibers, 5 percent after rubbing; massive; nonsticky and nonplastic; slightly acid.

Reaction ranges from very strongly acid to neutral throughout the profile. Woody fragments, mainly twigs,

branches, logs, and stumps, are throughout most pedons. They make up 15 to 30 percent of the volume in some pedons. The mean annual soil temperature ranges from 47 to 54 degrees F.

The surface tier typically is black (10YR 2/1) sapric material; however, in some pedons it is hemic material and in others it is sapric and hemic material. The structure of the surface tier is weak or moderate, coarse to fine granular.

The subsurface tiers have hue of 5YR, 7.5YR, or 10YR or are neutral in hue. They have value of 2 or 3 and chroma of 0 to 3. Some chromas, values, or both change from 0.5 to 2 after rubbing. Broken faces become darker after brief exposure to air. The layers are dominated by sapric material with a fiber content that is less than 16 percent of the organic volume after rubbing. The subsurface tiers have granular or blocky structure. The upper part typically is weak or moderate, fine to coarse granular. The lower part commonly is massive. The aggregates in these tiers are firm but break abruptly under pressure. The unrubbed, well decomposed organic material resembles woody plant tissue.

The bottom tiers are dominantly sapric material, but some pedons have thin layers of hemic material. The combined thickness of these hemic layers is less than 10 inches.

Chautauqua Series

The Chautauqua series consists of very deep, moderately well drained soils on glaciated uplands. These soils formed in deposits of glacial till and are dominated by material derived from sandstone and shale. Slope ranges from 3 to 15 percent.

Chautauqua soils are in a drainage sequence with the well drained Valois soils and the somewhat poorly drained Busti soils. Busti soils commonly are on landscapes similar to those of Mardin, Lackawanna, and Wellsboro soils, all of which have a fragipan. Chautauqua soils commonly are near Nunda and Burdett soils, which have a clayey subsoil.

Typical pedon of Chautauqua loam, 3 to 8 percent slopes, in Greenville, 1,200 feet east of the junction of County Routes 37 and 38, about 50 feet north of County Road 38, and 20 feet south of a cemetery:

Ap—0 to 8 inches; dark brown (10YR 3/3) loam; weak fine granular structure; friable; many medium and fine roots; 10 percent rock fragments; moderately acid; clear smooth boundary.

Bw1—8 to 20 inches; dark yellowish brown (10YR 4/4) gravelly loam; weak medium subangular blocky structure; friable; 20 percent rock fragments; moderately acid; clear wavy boundary.

Bw2—20 to 35 inches; brown (10YR 4/4) gravelly loam; few fine prominent grayish brown (2.5Y 5/2) and common medium prominent strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; common fine roots; 25 percent rock fragments; moderately acid; clear wavy boundary.

C—35 to 60 inches; dark grayish brown (10YR 4/2) gravelly loam; massive; firm; 30 percent rock fragments; moderately acid.

The thickness of the solum ranges from 20 to 45 inches. The depth to bedrock is more than 60 inches. Rock fragments make up 5 to 15 percent of the A horizon, 5 to 30 percent of the Bw horizon, and 15 to 45 percent of the C horizon. In unlimed areas reaction is moderately acid or slightly acid.

The Ap horizon has hue of 7.5YR to 2.5Y, value of 3 or 4, and chroma of 2 to 4. It is silt loam or loam in the fine-earth fraction. Structure is weak or moderate, medium or fine, and granular or subangular blocky. Consistence is friable or very friable.

The Bw horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 6. Few or common, fine or medium, distinct, low- and high-chroma mottles are at a depth of 18 to 24 inches. The horizon is silt loam or loam in the fine-earth fraction. It is more than 60 percent silt and very fine sand. Structure is weak or moderate, fine or medium subangular blocky. Consistence is very friable to firm.

The C horizon has hue of 7.5YR to 2.5Y, value of 3 to 5, and chroma of 2 to 4. It is silt loam or loam in the fine-earth fraction. It is more than 60 percent silt and very fine sand. Consistence is friable or firm.

Chenango Series

The Chenango series consists of very deep, well drained and somewhat excessively drained soils on glacial outwash plains and terraces. These soils formed in stratified sand and gravel. Slope ranges from 0 to 15 percent.

Chenango soils are near the well drained Tioga soils and the somewhat poorly drained Middlebury soils on flood plains and the very poorly drained Carlisle soils on the larger terraces. Chenango soils are similar to Riverhead and Tunkhannock soils, but Riverhead soils are not so gravelly, and Tunkhannock soils are more red.

Typical pedon of Chenango gravelly loam, 3 to 8 percent slopes, in Durham, 600 feet south of County Route 20 and 700 feet east of Paddock Road:

Ap—0 to 4 inches; dark brown (7.5YR 3/2) gravelly loam; weak fine granular structure; very friable; many fine roots; 25 percent rock fragments; strongly acid; abrupt smooth boundary.

Bw1—4 to 11 inches; brown (7.5YR 5/4) gravelly loam; weak fine granular structure; very friable; many fine roots; 30 percent rock fragments; strongly acid; clear wavy boundary.

Bw2—11 to 26 inches; dark brown (10YR 4/3) very gravelly loam; weak very fine granular structure; very friable; common fine roots; 45 percent rock fragments; strongly acid; gradual wavy boundary.

2C1—26 to 34 inches; dark brown (10YR 4/3) very gravelly loamy sand; single grained; loose; few fine roots; 60 percent rock fragments; strongly acid; gradual wavy boundary.

2C2—34 to 60 inches; dark brown (10YR 4/3), stratified sand and gravel; single grained; loose; few fine roots; 65 percent rock fragments; moderately acid.

The thickness of the solum ranges from 24 to 50 inches. The depth to bedrock is more than 60 inches. The content of rock fragments, mainly pebbles to flagstones, ranges from 10 to 30 percent in the A horizon, from 20 to 60 percent in the Bw horizon, and from 30 to 70 percent in the C horizon. The depth to carbonates is more than 72 inches. In unlimed areas reaction is very strongly acid or strongly acid in the A horizon, very strongly acid to moderately acid in the Bw horizon, and strongly acid to mildly alkaline in the 2C horizon.

The Ap horizon has hue of 7.5YR to 2.5Y, value of 3 to 5, and chroma of 2 or 3. It ranges from sandy loam to silt loam in the fine-earth fraction. It has weak or moderate granular structure and is very friable or friable.

The Bw horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 6. The hue of 7.5YR is restricted to the upper part. The horizon is fine sandy loam, very fine sandy loam, loam, or silt loam in the fine-earth fraction and is less than 50 percent fine sand and coarse sand. It is massive or has weak or very weak subangular blocky or granular structure. It ranges from very friable to firm.

The 2C horizon has hue of 10YR to 2.5Y, value of 3 to 5, and chroma of 2 to 4. It is loamy fine sand to coarse sand in the fine-earth fraction. It is massive or single grained.

Covington Series

The Covington series consists of very deep, poorly drained soils on lake and marine plains. These soils formed in lacustrine and marine sediments in the bed of former Ancient Lake Albany, in the eastern part of the county. Slope ranges from 0 to 3 percent.

Covington soils are in a drainage sequence with the moderately well drained Hudson and Vergennes soils and the somewhat poorly drained Kingsbury and Rhinebeck soils. Covington soils are associated with the poorly drained and very poorly drained Madalin soils, which have less clay in the solum.

Typical pedon of Covington silty clay, in an area of Covington and Madalin soils; in Athens, 40 feet south of County Road 74, about 0.75 mile west of its intersection with County Road 53, about 200 feet east of railroad tracks, in a cornfield:

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) silty clay, dark grayish brown (10YR 4/2) dry; moderate medium subangular blocky structure; firm; many fine and medium roots; slightly acid; clear smooth boundary.

Bg—7 to 13 inches; gray (10YR 5/1) clay; many medium and coarse prominent strong brown (7.5YR 5/8) and few fine faint light brownish gray (10YR 6/2) mottles; moderate medium and coarse angular blocky structure; firm; common fine and medium roots; common fine tubular and vesicular pores; stripped silt and very fine sand grains on faces of some peds; neutral; clear wavy boundary.

Btg—13 to 28 inches; gray (10YR 5/1) clay; gray (N 5/0) prism faces; many medium and fine yellowish brown (10YR 5/6) and olive brown (2.5Y 4/4) mottles; moderate very coarse prismatic structure parting to moderate medium and coarse angular blocky; firm, sticky; common fine vesicular and few fine tubular pores; nearly continuous clay films on faces of peds and thick clay linings in pores; neutral; abrupt smooth boundary.

C—28 to 60 inches; gray (N 5/0) silty clay; many medium prominent yellowish brown (10YR 5/6) mottles; weak medium platy structure; firm; vertical pressure faces (slickensides); white (10YR 8/1) lime deposits throughout; slight effervescence; mildly alkaline.

The thickness of the solum ranges from 24 to 48 inches. The depth to carbonates ranges from 24 to 60 inches. The depth to bedrock is at least 60 inches. The content of rock fragments is 0 to 2 percent in the solum and 0 to 5 percent in the C horizon.

The Ap horizon hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 1 or 2. The texture is silty clay loam or silty clay. Structure is granular or angular or subangular blocky. Consistence is firm. Reaction ranges from moderately acid to neutral.

The B horizon has hue of 7.5YR to 5Y and value of 4

or 5. It has chroma of 1 or 2 within a depth of 30 inches and chroma of 1 to 6 below that depth. It is clay. Structure is angular or subangular blocky, arranged within prisms in most pedons. Reaction ranges from moderately acid to mildly alkaline.

The C horizon has hue of 5Y to 2.5Y or is neutral in hue. It has value of 3 to 5 and chroma of 0 to 2. It is silty clay or clay. It is massive within varves, showing some evidence of weak thick platy structure. Reaction is neutral to moderately alkaline.

Elka Series

The Elka series consists of very deep, well drained soils on mountainous uplands. These soils formed mainly in glacial till derived from reddish sandstone and siltstone. Slope ranges from 3 to 70 percent.

Elka soils are associated with the moderately deep Vly and shallow Halcott soils on bedrock-controlled landforms. Elka soils are near the well drained Lewbeach soils, the moderately well drained Willowemoc soils, and the somewhat poorly drained Onteora soils, all of which have a fragipan.

Typical pedon of Elka channery loam, 15 to 25 percent slopes, in Prattsville, 75 feet north of Bear Pen Road, 1.5 miles west of the intersection of County Highway 2 and Bear Pen Road, 0.25 mile east of Delaware County:

Oi—3 to 2 inches; leaf litter.

Oe—2 inches to 0; dark reddish brown (5YR 2/2), partially decomposed leaf litter.

Ap—0 to 8 inches; dark reddish brown (2.5YR 3/4) channery loam; weak fine granular structure; many medium and coarse roots; 15 percent rock fragments; strongly acid; clear smooth boundary.

Bw1—8 to 14 inches; reddish brown (5YR 4/4) channery loam; very weak fine subangular blocky structure; friable; many medium tubular pores; 20 percent rock fragments; strongly acid; gradual wavy boundary.

Bw2—14 to 32 inches; reddish brown (2.5YR 4/4) channery loam; weak fine subangular blocky structure; firm; common medium and coarse roots; common tubular and few fine vesicular pores; 25 percent rock fragments; strongly acid; clear smooth boundary.

C—32 to 60 inches; reddish brown (5YR 4/4) channery very fine sandy loam; weak thick platy structure; firm; few fine roots; 30 percent rock fragments; strongly acid.

The thickness of the solum ranges from 30 to 45 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges from 10 to 35 percent throughout the profile. Reaction ranges from very strongly acid to moderately acid.

The A horizon has hue of 2.5YR to 7.5YR, value of 3 to 5, and chroma of 2 to 4. The fine-earth fraction is loam or silt loam. Structure is weak, very fine to medium, and granular or subangular blocky. Consistence is friable or very friable.

The B horizon has hue of 5YR or 2.5YR, value of 3 to 5, and chroma of 3 to 6. The fine-earth fraction is loam, silt loam, or very fine sandy loam. Structure is weak or moderate, fine or medium, and granular, subangular blocky, or platy. Consistence is friable or firm.

The C horizon has hue, value, chroma, and texture similar to those of the B horizon. Structure is platy, or the horizon is massive. Consistence is friable or firm.

Elmridge Series

The Elmridge series consists of very deep, moderately well drained soils on glacial lake plains. These soils formed in sandy lacustrine sediments over clayey sediments. Slope ranges from 0 to 8 percent.

Elmridge soils are on the same landscapes as the well drained Riverhead soils and the somewhat poorly drained Shaker and Rhinebeck soils. Riverhead soils are more than 40 inches deep to the underlying clayey material. Shaker soils are grayer in the subsoil than Elmridge soils, and Rhinebeck soils are more clayey throughout.

Typical pedon of Elmridge very fine sandy loam, 3 to 8 percent slopes, in a field in Coxsackie, 0.1 mile north of Adams Road and Johnny Cake Lane, 300 feet west of Johnny Cake Lane:

Ap—0 to 9 inches; dark brown (10YR 3/3) very fine sandy loam; weak fine granular structure; very friable; many medium and fine roots; moderately acid; abrupt smooth boundary.

Bw1—9 to 16 inches; yellowish brown (10YR 5/6) fine sandy loam; very weak fine subangular blocky structure; friable; common medium and fine roots; moderately acid; clear smooth boundary.

Bw2—16 to 21 inches; yellowish brown (10YR 5/6) fine sandy loam; common medium distinct light brownish gray (2.5Y 6/2) and many fine faint dark grayish brown (10YR 4/2) mottles; weak fine subangular blocky structure; friable; few fine roots; moderately acid; clear wavy boundary.

Bw3—21 to 28 inches; dark yellowish brown (10YR 4/4) fine sandy loam; common medium distinct light brownish gray (2.5Y 6/2) mottles; weak fine subangular blocky structure; friable; few fine roots;

few films of silt on vertical faces of peds, very few on horizontal faces; thin layer of silt and clay in root channels and pores; many manganese stains on faces of peds; moderately acid; clear wavy boundary.

2C—28 to 60 inches; olive gray (5Y 5/2) and olive brown (2.5Y 4/4) silty clay; many medium faint light olive gray (5Y 6/2) mottles; weak medium platy structure; firm; slightly acid.

The thickness of the solum, or depth to the underlying clayey material, ranges from 18 to 40 inches. The depth to bedrock is more than 60 inches. The content of rock fragments is 0 to 3 percent in the solum and 0 to 2 percent in the substratum. Reaction ranges from very strongly acid to slightly acid in the solum and from moderately acid to mildly alkaline in the substratum.

The A horizon has hue of 7.5YR or 10YR, value of 2 to 4, and chroma of 1 to 3. The texture is very fine sandy loam, fine sandy loam, sandy loam, or loam. Structure is weak or moderate, fine or medium granular. Consistence is very friable or friable.

The B horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 3 to 6. The texture is fine sandy loam, sandy loam, or loam. Structure is weak or moderate, fine or medium subangular blocky. Consistence is very friable or friable.

The 2C horizon has hue of 7.5YR to 5Y, value of 4 to 6, and chroma of 2 to 4. The texture is silty clay loam, silty clay, or clay. Structure is weak medium or thick platy and varved, or the horizon is massive. Consistence is firm or very firm.

Farmington Series

The Farmington series consists of shallow, well drained and somewhat excessively drained soils. These soils formed in 10 to 20 inches of glacial till over highly fractured, folded, and tilted limestone bedrock. Slope ranges from 2 to 35 percent.

Farmington soils are mapped in a complex with the moderately deep Galway soils. Farmington soils and the clayey, very deep Hudson and Rhinebeck soils are on similar nearby landscapes. Farmington soils are near Arnot and Nassau soils. They have a higher base status than those soils and have fewer rock fragments.

Typical pedon of Farmington gravelly silt loam, rolling, rocky, in Catskill, 500 feet north of New York Route 23A, 0.25 mile east of the New York State Thruway:

Ap—0 to 8 inches; dark brown (10YR 3/3) gravelly silt loam; weak fine and medium granular structure; very friable; many fine roots; 25 percent rock fragments; neutral (limed); abrupt smooth boundary.

Bw—8 to 13 inches; yellowish brown (10YR 5/4) silt loam; weak medium subangular blocky structure; friable; common fine roots; common fine pores; 10 percent rock fragments; neutral; abrupt smooth boundary.

R—13 inches; gray (10YR 5/1), massive limestone bedrock.

The thickness of the solum and the depth to bedrock range from 10 to 20 inches. The content of rock fragments ranges from 5 to 35 percent in the solum.

The Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 1 to 3. The texture is fine sandy loam, loam, or silt loam in the fine-earth fraction. Reaction in unlimed areas is strongly acid to slightly acid. Structure is weak fine and medium granular. Consistence is very friable.

The B horizon has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 2 to 6. The texture is fine sandy loam, loam, or silt loam in the fine-earth fraction. Structure is fine or medium subangular blocky to fine granular. Consistence is very friable or friable. Reaction is moderately acid to mildly alkaline.

The bedrock is limestone that generally is folded but is tilted in places.

Fluvaquents

Fluvaquents are very deep, somewhat poorly drained to very poorly drained soils that formed in recent alluvial deposits. These soils show little or no evidence of profile development. They are adjacent to streams and are subject to frequent flooding.

Fluvaquents are mapped with Udifluvents. They commonly are near Tioga, Middlebury, Barbour, and Basher soils but are in low areas where the adjacent stream, through scouring, cutting, and lateral erosion, frequently shifts the soil material from place to place.

Because Fluvaquents are highly variable, a typical pedon is not provided. The solum is 1 to 6 inches thick. The depth to bedrock is generally more than 5 feet. The content of coarse fragments, mainly gravel, cobblestones, and flagstones, ranges from 0 to 60 percent, by volume. These soils are very strongly acid to mildly alkaline.

The A horizon has hue of 7.5YR to 5Y or is neutral in hue. It has value of 2 to 4 and chroma of 0 to 2. It is fine sand to silty clay loam or their channery, gravelly, or very gravelly analogs.

The C horizon has hue of 10YR to 5Y or is neutral in hue. It has value of 3 to 6 and chroma of 0 to 3. It is commonly mottled. It is mainly sandy loam to silty clay

loam or their gravelly, channery, cobbly, or very gravelly analogs. In some pedons, however, it is very coarse sand to fine sand. Consistence is friable or loose.

Galway Series

The Galway series consists of moderately deep, well drained and moderately well drained soils in areas on glaciated uplands where bedrock is at a depth of 20 to 40 inches. These soils formed in glacial till over highly fractured, folded, and tilted limestone bedrock. Slope ranges from 2 to 25 percent.

Galway soils are adjacent to the clayey Hudson and Rhinebeck soils on the lower parts of the landscape. They are near Arnot and Nassau soils on similar landscapes. They have a higher base status than those soils and have fewer rock fragments. Galway soils are intricately mixed with areas of the shallow, well drained and somewhat excessively drained Farmington soils.

Typical pedon of Galway gravelly silt loam, in an area of Galway-Farmington gravelly silt loams, rolling, rocky; in Catskill, 0.25 mile east and 360 feet north of the New York State Thruway:

Ap—0 to 9 inches; dark brown (10YR 3/3) gravelly silt loam; moderate fine granular structure; very friable; many fine roots; 20 percent rock fragments; neutral; abrupt smooth boundary.

Bw1—9 to 16 inches; strong brown (7.5YR 5/6) gravelly silt loam; weak medium subangular blocky structure; friable; common fine roots; common fine pores; 20 percent rock fragments; neutral; clear wavy boundary.

Bw2—16 to 26 inches; yellowish brown (10YR 5/6) silt loam; weak medium subangular blocky structure; friable; common fine roots; common fine pores; less than 5 percent rock fragments; neutral; abrupt wavy boundary.

R—26 inches; gray (10YR 5/1), massive limestone bedrock.

The thickness of the solum ranges from 18 to 30 inches. Some pedons have a C horizon. The content of rock fragments ranges from 3 to 35 percent in the solum and from 10 to 70 percent in the C horizon. Reaction is moderately acid to neutral in the A horizon, moderately acid to mildly alkaline in the B horizon, and mildly alkaline or moderately alkaline in the C horizon.

The A horizon has hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 2 or 3. The texture is silt loam or loam in the fine-earth fraction. Structure is moderate fine to coarse granular or moderate medium subangular blocky. Consistence is very friable or friable.

The B horizon has hue of 5YR to 2.5Y and value and chroma of 3 to 6. Faint or distinct mottles with chroma of more than 2 are in the lower part of this horizon in some pedons. The texture is silt loam, loam, or fine sandy loam in the fine-earth fraction. Structure is weak or moderate, medium or coarse subangular blocky. Consistence is friable or firm.

Halcott Series

The Halcott series consists of shallow, somewhat excessively drained to moderately well drained soils. These soils formed in channery, acid glacial till that is 10 to 20 inches deep over sandstone or shale bedrock. They are on plateaus, benches, and steep valley sides in mountainous uplands where the topography is influenced by the underlying bedrock. Slope ranges from 3 to 45 percent.

Halcott soils are in a drainage sequence with the shallow, somewhat poorly drained and poorly drained Tor soils. Halcott soils are near Vly, Elka, Onteora, Lewbeach, and Willowemoc soils, all of which are deeper to bedrock than Halcott soils. Halcott soils are similar to Arnot soils but are in a colder temperature regime.

Typical pedon of Halcott channery silt loam, in an area of Vly-Halcott complex, rolling, very rocky; in Windham, in a road cut 400 feet south of the intersection of Barnum Road and a new development road:

Oi—1 inch to 0; dark reddish brown (5YR 2/2), slightly decomposed leaf litter.

A—0 to 5 inches; dark reddish brown (2.5YR 3/4) channery silt loam; weak fine granular structure; very friable; many fine and common medium roots; 30 percent rock fragments; very strongly acid; clear smooth boundary.

Bw—5 to 13 inches; dark reddish brown (2.5YR 3/4) and dark red (2.5YR 3/6) very channery silt loam; weak fine subangular blocky structure; friable; many fine and few coarse roots; 60 percent rock fragments; very strongly acid; abrupt smooth boundary.

R—13 inches; dark reddish brown (2.5YR 3/4), thinly bedded sandstone.

The thickness of the solum ranges from 10 to 16 inches. The depth to bedrock ranges from 10 to 20 inches. The content of rock fragments ranges from 15 to 20 percent in the A horizon and from 20 to 70 percent in the B horizon. It averages more than 35 percent in the control section. Reaction ranges from extremely acid to strongly acid throughout the profile.

The A horizon has hue of 2.5YR to 10YR, value of 3

or 4, and chroma of 2 to 4. It is channery or very channery loam, silt loam, or fine sandy loam. Structure is weak or moderate, fine or medium granular. Consistence is friable or very friable.

The B horizon has hue of 2.5YR to 10YR, value of 3 or 4, and chroma of 3 to 8. It is channery or very channery silt loam, loam, or fine sandy loam. Structure is weak or moderate, fine or medium, and subangular blocky or granular. Consistence is very friable or friable.

Hudson Series

The Hudson series consists of very deep, moderately well drained soils. These soils formed in lake-laid glaciolacustrine deposits of clay and silt. Slope ranges from 3 to 50 percent.

Hudson soils, the somewhat poorly drained Rhinebeck and Kingsbury soils, and the poorly drained and very poorly drained Madalin soils are in a drainage sequence and formed in the same kinds of material. Hudson soils are near Elmridge and Shaker soils, both of which contain more sand in the upper part of the solum.

Typical pedon of Hudson silt loam, in an area of Hudson and Vergennes soils, 3 to 8 percent slopes; in Coxsackie, in a gravel road cut in the Sleepy Hollow development, 600 feet north of Murder Kill Road, and 0.1 mile east of its intersection with County Route 57:

Ap—0 to 4 inches; dark brown (10YR 4/3) silt loam; weak fine granular structure; friable; many medium and fine roots; neutral; clear smooth boundary.

E—4 to 8 inches; pale brown (10YR 6/3) silt loam; weak medium subangular blocky structure; friable; many fine roots; slightly acid; clear wavy boundary.

BE—8 to 13 inches; brown (10YR 4/3) silty clay loam (B part); patchy pale brown (10YR 6/3) coatings on vertical faces of peds (E part); weak medium subangular blocky structure; firm; few fine roots; slightly acid; gradual wavy boundary.

Bt1—13 to 21 inches; olive brown (2.5Y 4/4) silty clay loam; common medium distinct yellowish brown (10YR 5/8) and few fine faint light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; firm; few manganese stains; many light brownish gray (10YR 6/2) clay films on faces of peds; few fine roots; neutral; gradual wavy boundary.

Bt2—21 to 25 inches; light olive brown (2.5Y 5/4) silty clay; few fine faint olive yellow (2.5Y 6/6) mottles; moderate medium subangular blocky structure; firm; many grayish brown (10YR 5/2) clay films on faces of peds; neutral; clear wavy boundary.

BC—25 to 30 inches; light olive brown (2.5Y 5/4) silt loam; moderate medium platy structure; firm; slightly effervescent; mildly alkaline; gradual wavy boundary.

C—30 to 60 inches; light olive brown (2.5Y 5/4) silty clay; varved; massive; firm; strongly effervescent; moderately alkaline.

The thickness of the solum ranges from 20 to 60 inches. The content of rock fragments ranges from 0 to 25 percent in the surface layer and subsurface layer and from 0 to 10 percent below the subsurface layer. The depth to carbonates ranges from 20 to 70 inches.

The Ap horizon has hue of 7.5YR to 2.5Y, value of 2 to 5, and chroma of 2 or 3. The texture of the fine-earth fraction is silt loam or silty clay loam. Structure is weak to strong, fine or medium, and granular or subangular blocky. Consistence is friable or firm. Reaction ranges from strongly acid to neutral.

The E horizon has hue of 7.5YR to 5Y, value of 5 or 6, and chroma of 2 or 3. The texture of the fine-earth fraction is silt loam or silty clay loam. Structure is weak or moderate subangular blocky or platy. Consistence is friable or firm. Reaction ranges from strongly acid to neutral.

The Bt horizon has hue of 7.5YR to 5Y, value of 3 to 6, and chroma of 2 to 4. High- and low-chroma mottles are common. The texture of the fine-earth fraction ranges from silty clay loam to clay. Structure is moderate or strong, medium or coarse, angular or subangular blocky, with or without coarse or very coarse prisms. Consistence is firm or very firm. Reaction is moderately acid to mildly alkaline.

The C horizon has hue of 5YR to 5Y, value of 3 to 5, and chroma of 1 to 4. The fine-earth fraction is clay or silty clay. The horizon is massive or has platy structure. Reaction is neutral to moderately alkaline.

Hydraquents

Hydraquents are very deep, very poorly drained soils that formed in mineral material. The location of these soils ranges from high elevations in the mountains to areas at sea level along the Hudson River. The soils are ponded with shallow water throughout much of the year or are subject to inundation by tides along the Hudson River. Areas of these soils are commonly called freshwater marshes or tidal marshes. Many areas are adjacent to lakes, rivers, ponds, and other bodies of water. Slope is 0 to 1 percent.

Hydraquents are in areas intermingled with Medisaprists in tidal marshes along the Hudson River. Hydraquents commonly are associated with Alden, Madalin, Canandaigua, and Carlisle soils in marshes and bogs and in depressional areas on uplands. The

associated soils have distinct horizons and are generally in areas bordering the marshes.

Hydraquents are named above the series level in the soil classification system because of the variability of the soil properties and the difficulty of examining individual areas adequately for proper classification at the series level. Because of this variability, a typical pedon is not provided.

The A horizon has hue of 10YR to 5GY or is neutral in hue. It has value of 2 to 4 and chroma of 0 to 2. It is silt loam or silty clay loam and is less than 15 percent rock fragments. Reaction is strongly acid to neutral.

The C horizon has hue of 10YR to 5GY, value of 3 to 6, and chroma of 1 or 2, or it is neutral in hue. Reaction is very strongly acid to moderately acid. The texture ranges mainly from silt loam to silty clay, but some pedons have thin strata of coarse textured material.

Kingsbury Series

The Kingsbury series consists of very deep, somewhat poorly drained soils formed in lake-laid or marine deposits in the eastern part of the county. Slope ranges from 0 to 8 percent.

Kingsbury soils and the moderately well drained Vergennes soils are in the same drainage sequence and formed in similar kinds of material. Kingsbury soils are mapped with Rhinebeck soils, which have less clay, and are near the poorly drained and very poorly drained Madalin soils and the sandy Elmridge and Shaker soils.

Typical pedon of Kingsbury clay loam, in an area of Kingsbury and Rhinebeck soils, 0 to 3 percent slopes; in Coxsackie, 500 feet east of County Road 57 and 0.25 mile south of its junction with Murder Kill Road:

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) clay loam; moderate medium and fine granular structure; friable; few medium and many fine roots; moderately acid; clear smooth boundary.

E—7 to 9 inches; pale brown (10YR 6/3) silty clay loam; common fine distinct strong brown (7.5YR 5/6) mottles; weak medium platy structure; firm; common fine roots; common fine tubular and few medium vesicular pores; slightly acid; clear irregular boundary.

BE—9 to 14 inches; brown (10YR 4/3) clay (B part); pale brown (10YR 6/3) faces of peds (E part); many medium and fine (50 percent) strong brown (7.5YR 5/6) mottles, dominantly on stripped silt coatings on vertical faces of peds; moderate medium and coarse angular blocky structure; firm; common fine roots; common fine tubular and few medium vesicular pores; slightly acid; gradual wavy boundary.

Btg1—14 to 23 inches; dark grayish brown (10YR 4/2) clay; grayish brown (10YR 5/2) faces of peds; many medium distinct (40 percent) brown (7.5YR 5/4) mottles; weak thick platy structure parting to moderate coarse angular blocky; firm; few fine roots; common fine tubular pores; thick clay linings in vertical pore openings and common prominent clay films on faces of peds; strongly acid; clear wavy boundary.

Btg2—23 to 36 inches; dark grayish brown (10YR 4/2) clay; gray (10YR 5/1) faces of peds; many fine faint brown (10YR 4/3) and dark grayish brown (10YR 4/2) and few fine and medium distinct strong brown (7.5YR 5/6) mottles; weak very coarse prismatic structure parting to moderate medium and coarse angular blocky; firm; nearly continuous clay flows on faces of peds; few roots along prism faces; few fine tubular and common vesicular pores; neutral; clear smooth boundary.

Cg—36 to 70 inches; gray (10YR 5/1), yellowish brown (10YR 5/6), and reddish gray (5YR 5/2) silty clay loam; 15 percent varves of silt loam and very fine sandy loam; moderate medium and thick platy structure; firm; numerous white (10YR 8/2) calcium nodules; few fine roots; some vertical pressure faces; mildly alkaline.

The thickness of the solum ranges from 20 to 48 inches. The depth to bedrock is more than 60 inches. The depth to carbonates ranges from 20 to 60 inches. The content of rock fragments is 0 to 3 percent, by volume.

The Ap horizon has hue of 7.5YR to 2.5Y, value of 2 to 4, and chroma of 1 to 3. It is very fine sandy loam to silty clay loam. Reaction is strongly acid to neutral.

The E horizon has hue of 10YR to 5Y, value of 3 to 6, and chroma of 2 to 4 and is mottled. It is silt loam, very fine sandy loam, or silty clay loam. It has weak or moderate subangular or platy structure. Consistence is friable or firm. Reaction is strongly acid to neutral.

The Bt horizon has hue of 10YR to 5Y, value of 3 to 5, and chroma of 2 to 4 and is mottled. It is clay. Structure is weak to strong and is prismatic to subangular or angular blocky. Consistence is firm or very firm. Reaction is strongly acid to mildly alkaline.

The Cg horizon has hue of 10YR to 5Y, value of 3 to 5, and chroma of 2 to 4. It is mainly silty clay or clay, but it is silt loam in varves. It is massive, with or without varving. Reaction is mildly alkaline or moderately alkaline.

Lackawanna Series

The Lackawanna series consists of very deep, well drained soils that have a fragipan. These soils are on

glaciated uplands. They are on the foothills and lower parts of the Catskill Mountains. They formed in firm till derived from reddish sandstone, siltstone, and shale. Slope ranges from 3 to 35 percent.

Lackawanna soils are associated with the moderately well drained Wellsboro soils, the somewhat poorly drained Morris soils, the moderately deep Oquaga soils, and the shallow Arnot soils.

Typical pedon of Lackawanna channery loam, 15 to 25 percent slopes, in Durham, 50 feet north of Gulf School House Road and 0.4 mile west of its intersection with Hulls Corners Road:

A—0 to 3 inches; dark brown (7.5YR 4/2) channery loam; weak fine granular structure; friable; many medium and fine roots; 20 percent rock fragments; moderately acid; clear smooth boundary.

Bw1—3 to 14 inches; brown (7.5YR 5/4) channery loam; very weak fine subangular blocky structure; friable; common fine and few medium roots; 20 percent rock fragments; common medium tubular pores; strongly acid; clear wavy boundary.

Bw2—14 to 26 inches; reddish brown (5YR 4/3) and dark reddish brown (5YR 3/4) channery loam; weak medium platy structure parting to weak fine subangular blocky; friable; few fine and medium roots; 20 percent rock fragments; common medium tubular pores; strongly acid; clear wavy boundary.

Bw3—26 to 30 inches; brown (7.5YR 4/4) channery loam; moderate medium platy structure parting to weak fine subangular blocky; firm; few fine roots; 25 percent rock fragments; strongly acid; clear smooth boundary; water entering at boundary.

Bx—30 to 60 inches; reddish brown (5YR 4/4) channery silt loam; few fine faint pinkish gray (7.5Y 6/2) mottles; brownish yellow (10YR 6/6) outer polygon streak and light brown (7.5YR 6/4) inner polygon streak; few faint clay films on prism faces; moderate very coarse prismatic structure with light brown (7.5YR 6/4) streaks and moderate medium platy structure parting to strong medium subangular blocky; few fine flattened roots along polygon faces; very firm; dense and brittle; 15 percent rock fragments; strongly acid.

The solum is at least 40 inches thick. The depth to bedrock is more than 60 inches. Depth to the fragipan ranges from 17 to 36 inches. The content of rock fragments ranges from 15 to 35 percent, by volume, in the part of the subsoil above the fragipan and from 15 to 50 percent in the fragipan and the C horizon. In unlimed areas reaction is very strongly acid or strongly acid above the fragipan and very strongly acid to moderately acid in the fragipan and the C horizon.

The Ap horizon has hue of 5YR to 10YR, value of 3 or 4, and chroma of 2 to 4. The texture of the fine-earth fraction is silt loam to fine sandy loam.

The Bw horizon has hue of 2.5YR to 10YR, value of 4 or 5, and chroma of 3 to 6. The texture of the fine-earth fraction is loam or silt loam.

The Bx horizon has hue of 10R to 5YR, value of 3 to 5, and chroma of 2 to 4. Some pedons have gray or brown mottles. The texture of the fine-earth fraction ranges from sandy loam to silt loam. The interiors of the very coarse prisms in this horizon are platy, subangular blocky, or massive.

Lewbeach Series

The Lewbeach series consists of very deep, well drained soils that have a fragipan. These soils are on glaciated uplands in the Catskill Mountains. They formed in firm till derived from reddish sandstone, siltstone, and shale. Slope ranges from 3 to 55 percent.

Lewbeach soils are associated with the moderately well drained Willowemoc soils, the somewhat poorly drained Onteora soils, the very poorly drained and poorly drained Suny soils, the moderately deep Vly soils, and the shallow Halcott soils.

Typical pedon of Lewbeach channery silt loam, 8 to 15 percent slopes, in Windham, 50 feet east of Nauvo Road, just before the entrance to the Lake Heloise camping area:

Ap—0 to 6 inches; dark reddish brown (5YR 3/3) channery silt loam; weak medium granular structure; very friable; many medium and fine roots; 15 percent rock fragments; strongly acid; clear smooth boundary.

Bw—6 to 18 inches; yellowish red (5YR 4/6) channery loam; weak fine subangular blocky structure; friable; common medium and fine roots; few fine vesicular pores; 20 percent rock fragments; strongly acid; clear smooth boundary.

Bx1—18 to 28 inches; reddish brown (5YR 4/4) channery loam; weak coarse prismatic structure parting to moderate medium subangular blocky; very firm; brittle; few medium flattened roots along polygon faces; thick clay patches on vertical and horizontal faces of peds; 20 percent rock fragments; strongly acid; clear wavy boundary.

Bx2—28 to 50 inches; reddish brown (5YR 5/4) channery loam; weak coarse prismatic structure parting to thick platy and weak fine subangular blocky; very firm; brittle; many thick films on faces of peds and in pore openings; very few fine tubular pores; 25 percent rock fragments; strongly acid; gradual smooth boundary.

C—50 to 60 inches; dark reddish brown (2.5Y 3/4) channery loam; very weak thick platy structure; firm; 15 percent rock fragments; slightly acid.

The solum is at least 40 inches thick. The depth to bedrock is more than 60 inches. Depth to the fragipan ranges from 18 to 36 inches. The content of rock fragments ranges from 5 to 35 percent, by volume, in the part of the subsoil above the fragipan and from 15 to 50 percent in the fragipan and the C horizon. In unlimed areas reaction is very strongly acid or strongly acid above the fragipan and ranges from very strongly acid to slightly acid in the fragipan and the C horizon.

The Ap horizon has hue of 5YR to 10YR, value of 2 to 4, and chroma of 2 or 3. The texture of the fine-earth fraction is silt loam to fine sandy loam.

The Bw horizon has hue of 2.5YR to 7.5YR, value of 4 or 5, and chroma of 3 to 6. The texture of the fine-earth fraction is loam, silt loam, or sandy loam.

The Bx horizon has hue of 2.5YR to 7.5YR, value of 3 to 5, and chroma of 2 to 4. In some pedons it has gray or brown mottles. The texture ranges from sandy loam to silt loam. The interiors of the very coarse prisms in this horizon are platy, subangular blocky, or massive.

The C horizon has colors and textures similar to those of the Bx horizon.

Lordstown Series

The Lordstown series consists of moderately deep, well drained soils on bedrock-controlled landforms in the areas between the Hudson Valley and the Catskill Mountains. These soils formed in glacial till 20 to 40 inches deep over grayish sandstone bedrock. Slope ranges from 0 to 55 percent.

Lordstown soils are in a drainage sequence with the shallow, poorly drained and somewhat poorly drained Tuller soils. They are associated with the somewhat excessively drained to moderately well drained Arnot soils, which are 10 to 20 inches deep to bedrock. Lordstown soils are near the moderately well drained Nunda soils and the somewhat poorly drained Burdett soils, both of which are very deep and have a clayey B horizon.

Typical pedon of Lordstown channery silt loam, 3 to 8 percent slopes, in Greenville, in a road cut on County Route 38, about 500 feet west of its junction with Cedar Lane:

Ap—0 to 5 inches; dark brown (10YR 3/3) channery silt loam; weak fine granular structure; very friable; many fine and medium roots; 30 percent rock fragments; strongly acid; abrupt smooth boundary.

Bw1—5 to 11 inches; dark yellowish brown (10YR 4/4) channery silt loam; weak fine subangular blocky structure; very friable; common fine roots; few fine pores; 25 percent rock fragments; strongly acid; clear wavy boundary.

Bw2—11 to 21 inches; yellowish brown (10YR 5/6) channery silt loam; weak fine subangular blocky structure; very friable; common fine roots; common fine pores; 30 percent rock fragments; very strongly acid; clear wavy boundary.

Bw3—21 to 26 inches; light olive brown (2.5Y 5/4) channery silt loam; weak medium subangular blocky structure; friable; few fine roots; few fine pores; 30 percent rock fragments; very strongly acid; abrupt wavy boundary.

R—26 inches; gray (10YR 5/1), fractured sandstone bedrock.

The depth to bedrock and the thickness of the solum range from 20 to 40 inches. The content of rock fragments, mainly channers and flagstones, ranges from 15 to 35 percent in the solum.

The Ap horizon has hue of 7.5YR to 2.5Y, value of 3 to 5, and chroma of 2 to 4. It is loam or silt loam in the fine-earth fraction. It has granular structure. Consistence is very friable. Reaction is very strongly acid to slightly acid.

The B horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 6. It is loam, very fine sandy loam, or silt loam in the fine-earth fraction. It has weak fine or very fine subangular blocky or granular structure. Consistence is very friable or friable. Reaction is moderately acid or strongly acid.

Lyons Series

The Lyons series consists of very deep, poorly drained and very poorly drained soils on the nearly level parts of till plains in the north-central part of the county. These soils formed in glacial till. Slope ranges from 0 to 3 percent.

Lyons soils are in a drainage sequence with the moderately well drained Nunda soils and the somewhat poorly drained Burdett soils. Lyons soils are near the shallow, somewhat excessively drained to moderately well drained Arnot soils and the moderately deep, well drained Lordstown soils.

Typical pedon of Lyons silt loam, in Greenville, 0.5 mile west of Greenville Center along County Route 35, about 90 feet north of County Route 35:

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam; weak fine subangular blocky structure; friable; many medium and fine roots; 5 percent rock

fragments; neutral; clear smooth boundary.

Bg1—9 to 14 inches; olive gray (5Y 5/2) silt loam; many medium prominent yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; friable; few fine roots; 5 percent rock fragments; neutral; clear wavy boundary.

Bg2—14 to 24 inches; olive gray (5Y 4/2) silt loam; many medium prominent yellowish brown (10YR 5/4) mottles; moderate fine subangular blocky structure; friable; very few fine roots; 10 percent rock fragments; carbonates at a depth of 20 inches; mildly alkaline; clear wavy boundary.

Cg1—24 to 43 inches; gray (10YR 5/1) silt loam; massive; friable; 10 percent rock fragments; strongly effervescent; moderately alkaline; gradual wavy boundary.

Cg2—43 to 61 inches; brown (7.5YR 5/2) silt loam; many medium distinct yellowish brown (10YR 5/6) mottles; massive; firm; 10 percent rock fragments; strongly effervescent; moderately alkaline.

The thickness of the solum ranges from 20 to 40 inches. The depth to carbonates ranges from 12 to 40 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges from 5 to 35 percent between depths of 10 and 40 inches and from 10 to 60 percent below a depth of 40 inches.

The Ap horizon has hue of 10YR or is neutral in hue. It has value of 2 or 3 and chroma of 0 to 2. It is fine sandy loam to silty clay loam in the fine-earth fraction. Reaction ranges from moderately acid to neutral. Consistence is friable or very friable.

The Bg horizon has hue of 5YR to 5Y, value of 4 to 6, and chroma of 1 or 2 and is mottled. It is fine sandy loam to silty clay loam in the fine-earth fraction. Structure is weak or moderate subangular blocky or prismatic parting to blocky. Reaction ranges from slightly acid to mildly alkaline.

The Cg horizon has hue of 5YR to 5Y, value of 4 to 6, and chroma of 1 or 2. It is fine sandy loam, silt loam, or loam in the fine-earth fraction. It is massive or has thick or thin platy structure. Reaction is mildly alkaline or moderately alkaline.

Madalin Series

The Madalin series consists of very deep, poorly drained and very poorly drained soils in level and depressional areas on lake plains. These soils formed in water-deposited clay and silt in the bed of glacial Lake Albany. Slope ranges from 0 to 3 percent.

Madalin soils are in a drainage sequence with the moderately well drained Hudson and Vergennes soils and the somewhat poorly drained Kingsbury and Rhinebeck soils. Madalin soils are mapped with Covington soils. They are associated with the somewhat poorly drained Burdett soils, which have a silt mantle over till, and with the shallow Nassau soils on the adjoining bedrock-controlled landscapes.

Typical pedon of Madalin silt loam, in an area of Covington and Madalin soils; in Coxsackie, 1,000 feet east of New York Route 9W, 0.5 mile north of the Athens town line, and 600 feet northwest of Murderers Creek:

Ap—0 to 9 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/2) dry; moderate fine subangular blocky structure; friable; many fine roots; moderately acid; abrupt smooth boundary.

Btg1—9 to 15 inches; dark grayish brown (10YR 4/2) silty clay; many medium distinct yellowish brown (10YR 5/6) mottles; moderate coarse prismatic structure parting to moderate fine and medium subangular blocky; firm, very sticky; common fine roots; few medium tubular and vesicular pores; moderately acid; clear wavy boundary.

Btg2—15 to 30 inches; gray (10YR 5/2) silty clay; many fine distinct yellowish brown (10YR 5/6) mottles; moderate coarse prismatic structure parting to strong medium subangular blocky; very sticky; few fine roots; common fine tubular pores; neutral; clear wavy boundary.

Cg—30 to 60 inches; dark grayish brown (2.5Y 4/2) silty clay; many medium distinct gray (N 5/0) and dark yellowish brown (10YR 4/4) and common fine distinct yellowish brown (10YR 5/6) mottles; massive; very thick bedding planes; firm, slightly sticky; few fine roots; few fine tubular pores; mildly alkaline; strongly effervescent.

The thickness of the solum ranges from 24 to 48 inches. The depth to carbonates ranges from 24 to 60 inches. The depth to bedrock is at least 60 inches. The content of rock fragments is 0 to 2 percent in the solum and 0 to 5 percent in the C horizon.

The Ap horizon has hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 1 or 2. The texture is silty clay loam or silty clay. Structure is granular or angular or subangular blocky. Consistence is firm. Reaction ranges from moderately acid to mildly alkaline.

The B horizon has hue of 7.5YR to 5Y and value of 4 or 5. It has chroma of 1 or 2 within a depth of 30 inches and chroma of 1 to 6 below that depth. The horizon has few to many, faint to prominent mottles. Structure is angular or subangular blocky, arranged within prisms in most pedons. Consistence is firm or very firm. Reaction ranges from moderately acid to mildly alkaline.

The C horizon has hue of 5Y to 2.5Y or is neutral in

hue. It has value of 3 to 5 and chroma of 0 to 2. The texture is silty clay or clay. The horizon is massive within varves but shows evidence of weak thick platy structure. Reaction is mildly alkaline or moderately alkaline.

Maplecrest Series

The Maplecrest series consists of very deep, well drained soils formed in glacial till derived from reddish sandstone, siltstone, and shale. These soils are on the moraines and lower valley sides of the Catskill Mountains and their foothills. Slope ranges from 3 to 45 percent.

Maplecrest soils are on landscapes similar to those of Lackawanna, Wellsboro, and Morris soils, all of which have a fragipan. Maplecrest soils are associated with the well drained Valois soils, which formed in glacial till and outwash and are in the adjacent valleys, and with Oquaga and Arnot soils on nearby bedrock-controlled landscapes.

Typical pedon of Maplecrest gravelly silt loam, 3 to 8 percent slopes, in a hayfield in Windham, east of County Route 21, about 0.5 mile north of its junction with Manor Drive:

Ap—0 to 8 inches; dark reddish brown (5YR 3/3) gravelly silt loam; weak fine granular structure; very friable; many medium and fine roots; 15 percent rock fragments; strongly acid; clear smooth boundary.

Bw1—8 to 18 inches; reddish brown (5YR 4/4) gravelly loam; weak fine granular structure; friable; many medium and fine roots; 20 percent rock fragments; strongly acid; clear smooth boundary.

Bw2—18 to 30 inches; reddish brown (5YR 5/4) gravelly loam; weak fine subangular blocky structure; firm; common medium and fine roots; 25 percent rock fragments; very strongly acid; clear wavy boundary.

Bw3—30 to 50 inches; reddish brown (5YR 4/3) gravelly loam; moderate fine subangular blocky structure; firm; few fine roots; 30 percent rock fragments; very strongly acid; clear wavy boundary.

2C—50 to 65 inches; reddish brown (5YR 5/3), stratified very gravelly sandy loam; massive; friable; 50 percent rock fragments; strongly acid.

The thickness of the solum ranges from 33 to 50 inches. The depth to bedrock is more than 60 inches. The content of rock fragments is 5 to 25 percent in the surface layer, 20 to 30 percent in the subsoil, and 25 to 60 percent in the substratum. Reaction is very strongly acid to slightly acid in the A and B horizons and strongly acid or moderately acid in the C horizon.

The Ap horizon has hue of 5YR or 7.5YR, value of 3, and chroma of 3 or 4. The fine-earth fraction is loam or silt loam. Structure is weak or moderate fine granular. Consistence is very friable.

The B horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 3 or 4. The fine-earth fraction is silt loam or loam. Structure is weak fine granular or weak fine subangular blocky. Consistence is friable or firm.

The C horizon has hue, value, and chroma similar to those of the B horizon. The fine-earth fraction is sandy loam to loam. The horizon has weak thick platy structure or is massive. Consistence is friable or firm.

Mardin Series

The Mardin series consists of very deep, moderately well drained soils on till plains in the uplands. These soils formed in glacial till derived mainly from sandstone, siltstone, and shale. They have a fragipan at a depth of 14 to 26 inches. Slope ranges from 3 to 25 percent.

Mardin soils are associated with the well drained Valois soils, the somewhat poorly drained Volusia soils, and the poorly drained and very poorly drained Alden soils, all of which formed in similar kinds of material. Mardin soils are similar to Wellsboro soils, which are red.

Typical pedon of Mardin gravelly silt loam, 8 to 15 percent slopes, in Greeneville, 200 feet east of Ingalside Road, 0.8 mile south of the county line:

Ap—0 to 9 inches; dark brown (10YR 4/3) gravelly silt loam; weak fine granular structure; very friable; 25 percent rock fragments; slightly acid; abrupt smooth boundary.

Bw1—9 to 15 inches; yellowish brown (10YR 5/4) gravelly silt loam; weak medium subangular blocky structure; very friable; common fine roots; 20 percent rock fragments; slightly acid; clear wavy boundary.

Bw2—15 to 21 inches; light olive brown (2.5YR 5/4) gravelly loam; few medium distinct yellowish brown (10YR 5/6) and common fine distinct dark brown (7.5YR 4/4) mottles; weak fine subangular blocky structure; common fine pores; 20 percent rock fragments; moderately acid; clear wavy boundary.

Bx—21 to 60 inches; olive brown (2.5Y 4/4) gravelly loam; common medium distinct dark brown (7.5YR 4/4) and few medium distinct light olive gray (5Y 6/2) mottles; pale brown (10YR 6/3) silt streaks with strong brown (7.5YR 5/8) borders; moderate coarse prismatic structure parting to weak fine and medium subangular blocky; very firm; brittle and dense; few roots along prism faces; few faint clay films in pores

and along prism faces; 25 percent rock fragments; moderately acid.

The thickness of the solum ranges from 40 to 70 inches. Depth to the fragipan ranges from 14 to 26 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges from 15 to 35 percent above the fragipan and from 20 to 60 percent in the fragipan.

The Ap horizon has hue of 7.5YR to 2.5Y, value of 3 or 4, and chroma of 2 to 4. The texture of the fine-earth fraction ranges from loam to silt loam. Structure is weak or moderate, fine or medium granular. Consistence is friable or very friable. Reaction in unlimed areas ranges from extremely acid to slightly acid.

The Bw horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8 and has common or many mottles between depths of 12 and 26 inches. The texture is loam to silt loam in the fine-earth fraction. Structure is very weak to moderate, very fine to medium, and subangular blocky or granular. Consistence is very friable to firm. Reaction ranges from extremely acid to slightly acid.

The Bx horizon has hue of 7.5YR to 5Y, value of 3 to 5, and chroma of 2 to 4 and has faint to prominent mottles and streaks. It is loam or silt loam in the fine-earth fraction. Structure is weak to strong very coarse prismatic. Consistence is firm or very firm. Reaction is very strongly acid to neutral.

Medisaprists

Medisaprists are very deep, very poorly drained soils formed in black, well decomposed herbaceous and woody plant remains. These soils are ponded with shallow water throughout much of the year or are subject to inundation by tides along the Hudson River. Areas of these soils commonly are called freshwater marshes or tidal marshes. Many areas are adjacent to natural or manmade lakes, rivers, ponds, and other bodies of water. Slope is 0 to 1 percent.

Medisaprists are intermingled with areas of Hydraquents in tidal marshes along the Hudson River Medisaprists commonly are associated with Alden, Madalin, Canandaigua, and Carlisle soils in marshes and bogs and in depressional areas on uplands.

Medisaprists are named above the series level in the soil classification system because of the variability of the soil properties and the difficulty of examining individual areas adequately for proper classification at the series level. Because of this variability, a typical pedon is not provided.

The upper part of Medisaprists has well decomposed organic material more than 16 inches thick. The underlying material is silty clay to gravelly loamy sand. In places bedrock underlies the organic deposits. The soils are ponded for at least 6 months of the year or have a fluctuating water table, which allows for aerobic decomposition of the organic matter.

The organic material has hue of 5YR to 2.5Y or is neutral in hue. It has value of 2 or 3 and chroma of 0 to 2. It consists of well decomposed, woody or herbaceous plant remains with less than 15 percent fibers after rubbing. Reaction is strongly acid to neutral.

Middlebury Series

The Middlebury series consists of very deep, somewhat poorly drained soils on flood plains. These soils formed in recent water-deposited material in the eastern and central parts of the county. Slope ranges from 0 to 3 percent.

Middlebury soils, the well drained Tioga soils, and the poorly drained and very poorly drained Wayland soils formed in similar alluvial deposits and are in the same drainage sequence. Middlebury soils are near Chenango soils on the adjacent outwash terraces. They also are near Riverhead soils, which are more sandy than Middlebury soils.

Typical pedon of Middlebury silt loam, in Coxsackie, 50 feet north of New York Route 81, about 200 feet southwest of Potic Creek, and 0.5 mile west of Earlton:

Ap—0 to 7 inches; dark grayish brown (2.5Y 4/2) silt loam; weak fine granular structure; very friable; many fine and medium roots; slightly acid; abrupt smooth boundary.

Bw1—7 to 15 inches; olive brown (2.5Y 4/4) silt loam; weak fine subangular blocky structure; friable; many fine roots; slightly acid; gradual wavy boundary.

Bw2—15 to 26 inches; brown (10YR 4/3) very fine sandy loam; common medium distinct light brownish gray (10YR 6/2) mottles; weak fine subangular blocky structure; friable; common fine roots; slightly acid; clear wavy boundary.

C1—26 to 44 inches; brown (10YR 4/3) fine sandy loam; common medium distinct light brownish gray (10YR 6/2) and common fine faint yellowish brown (10YR 5/6) mottles; massive; very friable; neutral; gradual wavy boundary.

2C2—44 to 60 inches; dark grayish brown (10YR 4/2), stratified gravelly fine sand; single grained; loose; 20 percent rock fragments; neutral.

The thickness of the solum ranges from 15 to 45 inches. The depth to bedrock is more than 60 inches. In unlimed areas reaction ranges from strongly acid to slightly acid in the A horizon and from moderately acid

to neutral in the B and C horizons. The content of coarse fragments ranges from 0 to 5 percent in the A horizon. Below the A horizon, it ranges 0 to 20 percent in individual horizons within a depth of 40 inches and from 0 to 50 percent below that depth.

The A horizon has hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 2 or 3. It ranges from fine sandy loam to silt loam. Structure is weak or moderate, fine to coarse, and granular or subangular blocky. Consistence is friable or very friable.

The B horizon has hue of 7.5YR to 5Y, value of 3 to 5, and chroma of 2 to 4. It has mottles in parts of all subhorizons in some pedons. The texture ranges mainly from fine sandy loam to silt loam but includes very fine sandy loam. Structure is weak or moderate, medium or coarse, and subangular blocky or prismatic. Consistence is friable or very friable.

The C horizon has hue of 7.5YR to 5Y, value of 4 or 5, and chroma of 1 to 4. It has common or many high- and low-chroma mottles. The fine-earth fraction ranges mainly from fine sandy loam to silt loam within a depth of 40 inches but includes stratified sand and gravel below that depth. Consistence is very friable to firm.

Morris Series

The Morris series consists of very deep, somewhat poorly drained soils on glacial till plains. These soils formed in firm glacial till derived from red sandstone, siltstone, and shale. They are on the lower slopes of foothills in the Catskill Mountains. Slope ranges from 0 to 15 percent.

Morris soils are in a drainage sequence with the well drained Lackawanna soils, the moderately well drained Wellsboro soils, and the poorly drained and very poorly drained Alden soils. Some areas of Morris soils are near Barbour and Basher soils, which are on flood plains, and Arnot and Oquaga soils, which have bedrock closer to the surface.

Typical pedon of Morris channery silt loam, 3 to 8 percent slopes, in Durham, 0.25 mile north of the junction of County Route 20 and Sutton Road, on the west side of County Route 20:

A—0 to 2 inches; dark brown (7.5YR 4/2) channery silt loam; weak fine granular structure; very friable; many fine roots; 20 percent rock fragments; strongly acid; abrupt smooth boundary.

Bw1—2 to 15 inches; brown (7.5YR 5/4) channery silt loam; few fine faint light brown (7.5YR 6/4) mottles; weak fine and medium subangular blocky structure; very friable; many fine roots; many fine pores; 25 percent rock fragments; strongly acid; clear wavy boundary.

Bw2—15 to 20 inches; brown (7.5YR 5/2) channery silt loam; many medium faint strong brown (7.5YR 5/8) and common fine distinct light brownish gray (10YR 6/2) mottles; weak fine and medium subangular blocky structure; very friable; common fine roots; common fine pores; 30 percent rock fragments; strongly acid; clear wavy boundary.

Bx1—20 to 30 inches; reddish brown (5YR 4/4) channery silt loam; common medium distinct light brownish gray (10YR 6/2) mottles; pinkish gray (5YR 6/2) prism faces bordered with yellowish red (5YR 5/8); weak very coarse prismatic structure and weak thick platy structure within prisms; very brittle; few fine roots along prism faces; few tubular pores; 30 percent rock fragments; strongly acid; gradual wavy boundary.

Bx2—30 to 60 inches; weak red (2.5YR 4/2) channery silt loam; common medium distinct light brownish gray (10YR 6/2) and many medium distinct yellowish red (5YR 4/6) mottles; pinkish gray (5YR 6/2) prism faces bordered with yellowish red (5YR 5/8); thin clay films in pores and on prism faces; weak very coarse prismatic structure and weak thick platy structure within prisms; very firm; very brittle; few fine roots along prism faces; few pores; 30 percent rock fragments; strongly acid.

The solum is at least 40 inches thick. The depth to bedrock is more than 60 inches. Depth to the fragipan ranges from 10 to 22 inches. Reaction ranges from very strongly acid to moderately acid throughout the profile. The content of rock fragments ranges from 15 to 40 percent in the A and Bw horizons and from 15 to 50 percent in the Bx horizon.

The A or Ap horizon has hue of 5YR to 10YR, value of 3 to 6, and chroma of 1 to 4. It is loam or silt loam in the fine-earth fraction. Structure is weak fine or medium subangular blocky. Consistence is friable or very friable.

The Bw horizon has hue of 5YR to 10YR, value of 3 to 6, and chroma of mainly 2 to 6. It has high- and low-chroma mottles. Some subhorizons have chroma of 1 or 2 in the matrix or on faces of peds. The texture of the fine-earth fraction is loam or silt loam.

The Bx horizon has hue of 2.5YR to 7.5YR, value of 4 or 5, and chroma of 2 to 6. In most pedons it has gray or brown mottles. The texture is loam or silt loam in the fine-earth fraction.

Nassau Series

The Nassau series consists of shallow, somewhat excessively drained soils formed on bedrock-controlled, glacially modified landforms in the eastern part of the county. Slope ranges from 5 to 45 percent.

Nassau soils are associated with the very deep, well drained Valois soils and the clayey Hudson and Rhinebeck soils. Nassau soils are near Arnot and Farmington soils. They do not have the horizontal sandstone bedrock lithology typical of Arnot soils and have a lower base status and a higher content of coarse fragments than Farmington soils.

Typical pedon of Nassau channery silt loam, rolling, in Catskill, in an area wooded with oak and hickory, 0.25 mile northeast of the junction of High Falls Road and Mossy Hill Road, 700 feet east of the shale pit entrance on High Falls Road:

Oi—1 inch to 0; slightly decomposed oak leaves and moss.

A—0 to 3 inches; dark brown (10YR 4/3) channery silt loam; weak fine granular structure; very friable; many fine roots and pores; 15 percent rock fragments; strongly acid; clear wavy boundary.

Bw1—3 to 13 inches; brown (7.5YR 4/4) very channery silt loam; weak fine subangular blocky structure; very friable; many fine roots and pores; 60 percent rock fragments; strongly acid; clear wavy boundary.

Bw2—13 to 18 inches; yellowish brown (10YR 5/6) extremely channery silt loam; weak very fine subangular blocky structure; very friable; 70 percent shale fragments; many fine pores; common fine roots; strongly acid; abrupt wavy boundary.

R—18 inches; gray and light gray, folded shale bedrock.

The thickness of the solum and the depth to bedrock range from 10 to 20 inches. Rock fragments, derived mainly from shale and slate, make up 10 to 50 percent of the A horizon and 35 to 70 percent of the B horizon. Reaction is strongly acid or very strongly acid throughout the profile.

The A or Ap horizon has hue of 7.5YR to 2.5Y, value of 3 to 5, and chroma of 2 or 3. The texture is loam or silt loam in the fine-earth fraction. Structure is weak or moderate, medium or fine granular. Consistence is friable or very friable.

The B horizon has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 3 to 6. The texture is loam or silt loam in the fine-earth fraction. Structure is weak or moderate, medium or fine subangular blocky. Consistence is friable or very friable.

Nunda Series

The Nunda series consists of very deep, moderately well drained soils on till plains in the eastern part of the county. These soils formed in two deposits of glacial till. Slope ranges from 3 to 35 percent.

Nunda soils, the somewhat poorly drained Burdett soils, and the poorly drained and very poorly drained Lyons soils formed in the same kind of material. Nunda soils are associated with Arnot, Lordstown, and Tuller soils, which are shallower to bedrock.

Typical pedon of Nunda silt loam, 8 to 15 percent slopes, in New Baltimore, in an apple orchard on Korts Farm, 50 feet north of County Road 51, about 1,800 feet west of its junction with Mount Misery Road:

Ap—0 to 8 inches; dark brown (10YR 4/3) silt loam; moderate fine granular structure; friable; many fine and medium roots; 5 percent rock fragments; strongly acid; abrupt smooth boundary.

BE—8 to 15 inches; brown (10YR 4/3) silt loam (B part); moderate medium and fine subangular blocky structure; friable; grayish brown (10YR 5/2) silt coatings on vertical faces of peds (E part); common fine and medium roots; 10 percent rock fragments; slightly acid; clear wavy boundary.

2Bt—15 to 28 inches; brown (10YR 4/3) gravelly silty clay loam; few medium distinct yellowish brown (10YR 5/6) and few medium distinct grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; friable; many thin discontinuous clay films; common fine and medium roots; 15 percent rock fragments; neutral; clear wavy boundary.

2BC—28 to 40 inches; dark grayish brown (2.5Y 4/2) silt loam; weak coarse subangular blocky structure; friable; common fine roots; 10 percent rock fragments; neutral; clear wavy boundary.

2C1—40 to 51 inches; dark grayish brown (2.5Y 4/2) silt loam; few medium distinct yellowish brown (10YR 5/6) mottles; massive; friable; 10 percent rock fragments; neutral; clear wavy boundary.

2C2—51 to 65 inches; dark grayish brown (10YR 4/2) silt loam; few medium distinct yellowish brown (10YR 5/6) mottles; massive; friable; neutral.

The thickness of the solum ranges from 30 to 50 inches. The depth to carbonates ranges from 30 to 72 inches. The thickness of the silty mantle ranges from 13 to 30 inches. The content of rock fragments less than 3 inches wide ranges from 0 to 25 percent in the silty mantle and from 5 to 30 percent in the underlying till. Reaction ranges from strongly acid to neutral in the A and E horizons, from moderately acid to neutral in the Bt horizon, and from slightly acid to moderately alkaline in the substratum.

The A horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 2 or 3. It is silt loam or very fine sandy loam in the fine-earth fraction. Structure is very weak to moderate, fine or medium granular.

The 2Bt horizon has hue of 10YR to 5Y, value of 4 or

5, and chroma of 2 or 3. It has high- or low-chroma mottles. It is dominantly silty clay loam or clay loam in the fine-earth fraction, but some pedons have thin subhorizons that are loam or silt loam and have a clay content of 20 to 27 percent.

The 2C horizon has colors similar to those of the 2Bt horizon. The texture ranges from loam to silty clay loam in the fine-earth fraction.

Ochrepts

Ochrepts are soils in areas that have been dissected into small units by shifting streams that create ravines and other waterways. The units appear as islands and flood channels. Slope ranges from 0 to 8 percent.

Because of the variability of Ochrepts, a typical pedon is not provided. The A horizon generally is 1 to 5 inches thick. The depth to bedrock is at least 10 inches. The content of rock fragments, mainly pebbles, channers, flagstones, and boulders, ranges from 10 to 70 percent, by volume, in individual subhorizons. Reaction ranges from very strongly acid to slightly acid.

The A horizon dominantly has hue of 5YR to 10YR, value of 3 to 5, and chroma of 3 to 6. The texture is silt loam to fine sandy loam or their gravelly or channery analogs.

The B horizon has hue of 5YR to 10YR, value of 3 to 6, and chroma of 3 to 8. The texture is silt loam to sandy loam or their gravelly or channery analogs.

The C horizon has hue, value, and chroma similar to those of the B horizon. The texture ranges mainly from silt loam to loamy sand, but in some pedons the horizon is stratified sand and gravel. Consistence ranges from very friable to firm, depending on the texture.

Onteora Series

The Onteora series consists of very deep, somewhat poorly drained soils on uplands in the Catskill Mountains. These soils formed in glacial till derived from red sandstone, siltstone, and shale. Slope ranges from 3 to 15 percent.

Onteora soils are in a drainage sequence with the well drained Lewbeach soils, the moderately well drained Willowemoc soils, and the poorly drained and very poorly drained Suny soils. Some areas of Onteora soils are adjacent to Barbour and Basher soils, which are on flood plains.

Typical pedon of Onteora silt loam, 3 to 8 percent slopes, in a meadow in Jewett, 75 feet south of County Road 23C, 0.4 mile west of its intersection with Scribner Hollow Road:

Ap—0 to 9 inches; dark reddish brown (5YR 3/3) silt loam; moderate fine subangular blocky structure; friable; many fine roots; 10 percent rock fragments; very strongly acid; clear smooth boundary.

Bw—9 to 14 inches; reddish brown (5YR 5/4) gravelly loam; many medium distinct dark yellowish brown (10YR 4/6) and common fine distinct light brown (7.5YR 6/4) mottles; weak medium platy structure parting to weak fine subangular blocky; friable; common fine roots; many fine tubular pores; 15 percent rock fragments; strongly acid; clear smooth boundary.

Bx1—14 to 25 inches; reddish brown (5YR 5/4) gravelly silt loam; common fine distinct brownish yellow (10YR 6/6) mottles; weak coarse prismatic structure parting to weak thick platy; prisms separated by light brownish gray (10YR 6/2) streaks of fine sandy loam with yellowish red (5YR 5/8) borders; very firm; brittle; common fine tubular and few medium vesicular pores; thin clay coatings on the sides of some pores; 25 percent rock fragments; neutral; clear wavy boundary.

Bx2—25 to 43 inches; dark reddish brown (5YR 3/4) gravelly silt loam; common fine faint reddish brown (5YR 5/3) mottles; weak very coarse prismatic structure parting to weak thick platy; prisms separated by pinkish gray (5YR 6/2) with yellowish red (5YR 4/6) borders; very firm; brittle; common fine tubular pores, some of which have thin clay films; 25 percent rock fragments; strongly acid; clear smooth boundary.

C—43 to 60 inches; reddish brown (5YR 4/4) very gravelly loam; massive; firm; 35 percent rock fragments; strongly acid.

The thickness of the solum ranges from 25 to 60 inches. The depth to bedrock is more than 60 inches. The content of rock fragments, by volume, ranges from 10 to 25 percent in the surface layer and from 15 to 50 percent in the subsoil and substratum. Reaction ranges from very strongly acid to slightly acid above the fragipan and from very strongly acid to moderately acid in the fragipan and the C horizon.

The A horizon has hue of 5YR and value and chroma of 2 or 3. The fine-earth fraction is silt loam or loam. Structure is weak fine granular or moderate fine subangular blocky. Consistence is friable or very friable.

The Bw horizon has hue of 5YR to 2.5YR, value of 3 to 5, and chroma of 3 to 6. It has brown or gray mottles. The fine-earth fraction is silt loam or loam. Structure is weak fine or medium subangular blocky or weak thin or medium platy. Consistence is very friable, friable, or firm.

The Bx horizon has hue of 5YR or 2.5YR, value of 3 to 5, and chroma of 3 or 4. The fine-earth fraction is silt loam or loam. Structure is weak very coarse prismatic

or platy parting to weak fine subangular blocky, or the horizon is massive. Consistence is firm or very firm.

Oquaga Series

The Oquaga series consists of moderately deep, well drained to excessively drained soils on bedrock-controlled landforms on foothills and in some mountainous areas. These soils formed in 20 to 40 inches of glacial till over bedrock. Slope ranges from 3 to 55 percent.

Oquaga soils are in a drainage sequence with the poorly drained and somewhat poorly drained Tuller soils and the somewhat excessively drained to moderately well drained Arnot soils. Oquaga soils are near the well drained Lackawanna soils, the moderately well drained Wellsboro soils, and the somewhat poorly drained Morris soils.

Typical pedon of Oquaga very channery silt loam, 3 to 8 percent slopes, in Durham, 0.25 mile northeast of the intersection of County Route 20 and Edison and Timmerman Roads, 300 feet north of the town line:

Ap—0 to 8 inches; dark brown (7.5YR 3/2) very channery silt loam; weak fine granular structure; very friable; many fine and medium roots; 35 percent rock fragments; strongly acid; abrupt smooth boundary.

Bw1—8 to 15 inches; reddish brown (5YR 4/4) very channery silt loam; weak fine subangular blocky structure; very friable; common fine and medium roots; few fine pores; 40 percent rock fragments; clear wavy boundary.

Bw2—15 to 22 inches; yellowish red (5YR 5/8) very channery silt loam; weak fine and medium subangular blocky structure; very friable; common fine roots; few fine pores; 40 percent rock fragments; strongly acid; abrupt irregular boundary.

R—22 inches; red and gray, massive sandstone and shale bedrock.

The thickness of the solum and the depth to bedrock range from 20 to 40 inches. The content of coarse fragments ranges from 15 to 50 percent in the surface layer and from 35 to 80 percent in the Bw horizon. Reaction ranges from extremely acid to moderately acid throughout the profile.

The A horizon has hue of 2.5YR to 10YR, value of 3 or 4, and chroma of 2 to 4. The texture is silt loam to sandy loam in the fine-earth fraction. Structure is granular or subangular blocky. Consistence is friable or very friable.

The B horizon has hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 3 to 8. The texture of the fine-earth fraction is loam or silt loam. Structure is weak or very weak granular or subangular blocky. Consistence is very friable to firm.

Rhinebeck Series

The Rhinebeck series consists of very deep, somewhat poorly drained soils on lake plains. These soils formed in material deposited in still water in the bed of glacial Lake Albany. Slope ranges from 0 to 8 percent.

Rhinebeck soils are in a drainage sequence with and formed in the same kind of material as the moderately well drained Hudson and Vergennes soils and the poorly drained and very poorly drained Madalin soils. Rhinebeck soils are near Elmridge and Shaker soils, which formed typically in deposits of very fine sandy loam and fine sandy loam and are underlain by clayey material at a depth of 20 to 40 inches. They also are near the shallow Nassau soils and the very deep, well drained Valois soils.

Typical pedon of Rhinebeck silt loam, in an area of Kingsbury and Rhinebeck soils, 0 to 3 percent slopes; in Athens, 650 feet north of the Schoharie Turnpike, 1,000 feet east of its junction with New York Route 9W:

Ap—0 to 7 inches; dark brown (10YR 3/3) silt loam; weak very fine subangular blocky structure; friable; few fine roots; slightly acid; clear smooth boundary.

E—7 to 11 inches; brown (10YR 5/3) silty clay loam; common medium distinct strong brown (7.5YR 5/6) and few fine faint gray (10YR 5/2) mottles; weak thin platy structure breaking to weak fine subangular blocky; friable; few fine roots; slightly acid; clear wavy boundary.

BE—11 to 19 inches; dark yellowish brown (10YR 3/4) silty clay loam (B part); light brownish gray (10YR 6/2) faces of peds (E part); moderate fine subangular blocky structure; firm; thick clay films on some vertical and horizontal faces of peds; medium and fine pore openings; few fine roots; neutral; clear wavy boundary.

Bt—19 to 32 inches; brown (10YR 5/3) silty clay; many medium distinct dark brown (7.5YR 3/2) and many fine distinct light brownish gray (10YR 6/2) mottles; weak medium prismatic structure parting to weak fine subangular blocky; firm; thick clay films in medium and fine vertical and horizontal pore openings; neutral; clear wavy boundary.

C—32 to 60 inches; yellowish brown (10YR 5/4) silty clay; many medium prominent light gray (N 7/0) and few fine prominent very dark gray (N 3/0) mottles; inherited platy structure within varves; firm; moderately alkaline.

The A horizon has hue of 7.5YR to 2.5Y, value of 2 to 4, and chroma of 1 to 3. It is silt loam or silty clay loam. It has granular or subangular blocky structure and is very friable or friable. Reaction is strongly acid to neutral.

The E horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 to 3 and is mottled. It is silt loam, very fine sandy loam, or silty clay loam. It has weak or moderate, subangular blocky or platy structure and is very friable or firm. Reaction is strongly acid to neutral.

The BE horizon has the same hue and value as the E horizon, but chroma ranges from 3 to 6. The texture ranges from silt loam to silty clay. Consistence is friable or firm. Reaction is strongly acid to neutral.

The Bt horizon has hue of 10YR to 5Y, value of 3 to 5, and chroma of 2 to 4 and is mottled. It is silty clay loam or silty clay. It has weak to strong, prismatic to subangular or angular blocky structure and is firm or very firm. Reaction is strongly acid to mildly alkaline.

The C horizon has hue of 10YR to 5Y, value of 3 to 5, and chroma of 1 to 4. It is silty clay loam to clay. It is massive, with or without varving. Reaction is slightly acid to moderately alkaline.

Riverhead Series

The Riverhead series consists of very deep, well drained soils on beach ridges and plains along glacial Lake Albany. These soils formed in glacial outwash and water-sorted morainic deposits. Slope ranges from 0 to 25 percent.

Riverhead soils are associated with the moderately well drained Elmridge and somewhat poorly drained Shaker soils, which are on similar landscapes and contain more clay in the lower part of the solum. Riverhead soils are near the clayey Hudson, Rhinebeck, and Madalin soils.

Typical pedon of Riverhead loam, rolling, on a mound in Catskill, 30 feet south of Suburban Drive, 0.2 mile southwest of the hospital:

Ap—0 to 8 inches; dark brown (10YR 4/3) loam; moderate medium granular structure; very friable; strongly acid; clear smooth boundary.

Bw1—8 to 15 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak fine subangular blocky structure; friable; very strongly acid; clear smooth boundary.

Bw2—15 to 24 inches; dark yellowish brown (10YR 4/4) sandy loam; weak fine subangular blocky structure; very friable; strongly acid; clear smooth boundary.

2C—24 to 60 inches; brown (10YR 4/3) loamy sand; massive; very friable; strongly acid.

The thickness of the solum ranges from 22 to 36 inches. The depth to bedrock is more than 60 inches. Reaction is very strongly acid to moderately acid throughout the profile. The content of rock fragments, mainly pebbles, ranges from 0 to 35 percent.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. The texture of the fine-earth fraction is sandy loam or loam. Structure is weak or moderate granular. Consistence is friable or very friable.

The B horizon has hue of 7.5YR to 2.5Y and value and chroma of 4 to 6. The texture of the fine-earth fraction is sandy loam or fine sandy loam. Structure is weak subangular blocky. Consistence is friable or very friable.

The C horizon has hue of 10YR to 2.5Y, value of 4 to 7, and chroma of 3 to 6. It is massive or single grained. It is loamy sand or sand and gravel.

Shaker Series

The Shaker series consists of very deep, somewhat poorly drained soils on lacustrine plains in the eastern part of the county. These soils are in glacial Lake Albany. Slope ranges from 0 to 3 percent.

Shaker soils are in a drainage sequence with the moderately well drained Elmridge soils. They are associated on the landscape with Hudson, Rhinebeck, and Madalin soils, which are more clayey than Shaker soils.

Typical pedon of Shaker very fine sandy loam, in Coxsackie, 300 feet north of Vosbourgh Greenehouses and 300 feet west of New York Route 385:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) very fine sandy loam; weak fine granular structure; friable; many medium and fine roots; slightly acid; abrupt smooth boundary.

E—8 to 16 inches; light brownish gray (2.5Y 6/2) fine sandy loam; many medium distinct brownish yellow (10YR 6/6) mottles; weak fine subangular blocky structure; friable; few fine roots; strongly acid; clear smooth boundary.

Bw—16 to 20 inches; yellowish brown (10YR 5/4) fine sandy loam; common medium distinct light olive gray (5Y 6/2) mottles and some ped coatings; weak medium subangular blocky structure; friable; few fine roots; strongly acid; clear smooth boundary.

2Bg—20 to 31 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine distinct yellowish brown (10YR 5/8) mottles and pockets of brown (10YR 5/2) sandy clay loam; moderate medium subangular blocky structure; firm; strongly acid; clear smooth boundary.

2Cg—31 to 60 inches; olive gray (5Y 5/2) silty clay; common fine distinct yellowish brown (10YR 5/8) mottles; very weak thick platy structure; firm; slightly acid.

The thickness of the solum and depth to the underlying clayey material range from 18 to 40 inches. The content of rock fragments is 0 to 5 percent in the solum and 0 to 2 percent in the C horizon. Reaction is strongly acid to slightly acid in the solum and moderately acid to neutral in the 2C horizon.

The Ap horizon has hue of 10YR or 7.5YR, value of 2 to 4, and chroma of 1 or 2. The texture is sandy loam, loam, fine sandy loam, or very fine sandy loam. Structure is weak or moderate, fine or medium granular. Consistence is friable or very friable.

The B horizon has hue of 7.5YR to 5Y, value of 4 to 6, and chroma of 2 to 4. The texture ranges from very fine sandy loam or sandy loam in the upper part to silty clay in the 2B horizon. Structure is weak or moderate, fine or medium, and subangular or angular blocky. Consistence is friable or firm.

The 2C horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 to 4. The texture is silty clay loam, silty clay, or clay. The horizon is massive or has weak medium or thick platy structure. Consistence is firm or very firm.

Suny Series

The Suny series consists of very deep, very poorly drained and poorly drained soils in glaciated uplands on the upper parts of the Catskill Mountains. These soils are in low spots and depressions and in some areas that receive seepage from the higher lying bedrock landforms. They formed in reddish glacial till. Slope ranges from 0 to 3 percent.

Suny soils are in a drainage sequence with the well drained Lewbeach soils, the moderately well drained Willowemoc soils, and the somewhat poorly drained Onteora soils.

Typical pedon of Suny gravelly silt loam, very stony, in a swamp in Windham, 500 feet south of County Road 10, about 0.1 mile east of its junction with County Road 19:

A—0 to 8 inches; dark reddish brown (5YR 3/2) gravelly silt loam; weak fine granular structure; many fine roots; 15 percent rock fragments; friable, slightly sticky and slightly plastic; strongly acid; abrupt wavy boundary.

Bg—8 to 15 inches; dark gray (5YR 4/1) loam; few fine faint light gray (5YR 6/1) and common medium distinct strong brown (7.5YR 5/6) and dark reddish brown (2.5YR 3/4) mottles; weak coarse subangular blocky structure; firm, slightly sticky and slightly plastic; few fine roots; 10 percent rock fragments; strongly acid; clear wavy boundary.

Bw—15 to 19 inches; reddish brown (5YR 4/3) gravelly loam; few medium faint reddish brown (5YR 4/4) mottles; weak very coarse subangular blocky structure; firm, slightly sticky and slightly plastic; 20 percent rock fragments; strongly acid; clear wavy boundary.

C—19 to 63 inches; reddish brown (5YR 4/3) gravelly loam; massive; very firm; 30 percent rock fragments; strongly acid.

The thickness of the solum ranges from 15 to 30 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges from 5 to 35 percent in the A and B horizons and from 10 to 40 percent in the C horizon. Reaction ranges from extremely acid to strongly acid throughout the profile.

The A horizon has hue of 10YR to 5YR, value of 1 to 3, and chroma of 1 or 2. It is silt loam to sandy loam in the fine-earth fraction. Consistence is friable or very friable.

The B horizon has hue of 10YR to 5YR, value of 3 to 6, and chroma of 1 to 4 and is mottled. It is silt loam to sandy loam in the fine-earth fraction. Structure is weak subangular blocky, or the horizon is massive. Consistence is friable or firm.

The C horizon has hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 3 or 4. It is silt loam to sandy loam in the fine-earth fraction. Consistence is very firm or firm. The horizon is massive.

Tioga Series

The Tioga series consists of very deep, well drained soils on flood plains. These soils formed in recent water-deposited material in the eastern and central parts of the county. Slope ranges from 0 to 3 percent.

Tioga soils formed in the same kind of material as and are in a drainage sequence with the somewhat poorly drained Middlebury soils and the poorly drained and very poorly drained Wayland soils. Tioga soils are near Chenango soils, which formed in glacial outwash, and Nunda and Burdett soils, which formed in glacial till.

Typical pedon of Tioga loam, in a hayfield in Cairo, 1,400 feet west of Warren Stein Road and 0.5 mile northwest of its junction with County Route 67:

Ap—0 to 10 inches; dark brown (7.5YR 3/2) loam; weak fine and medium granular structure; very friable; many fine roots; 2 percent rock fragments; neutral; abrupt smooth boundary.

Bw1—10 to 20 inches; brown (7.5YR 4/2) fine sandy

loam; weak fine granular structure; very friable; common roots; 1 percent rock fragments; neutral; clear wavy boundary.

Bw2—20 to 26 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine granular structure; very friable; common roots; 1 percent rock fragments; neutral; clear wavy boundary.

Bw3—26 to 34 inches; brown (7.5YR 4/2) fine sandy loam; weak fine granular structure; very friable; common roots; 1 percent rock fragments; neutral; clear wavy boundary.

C1—34 to 40 inches; dark brown (10YR 3/3) loamy fine sand; single grained; loose; few roots; 1 percent rock fragments; neutral; gradual wavy boundary.

C2—40 to 44 inches; brown (7.5YR 4/2) fine sandy loam; massive; very friable; few roots; 1 percent rock fragments; slightly acid; clear wavy boundary.

2C3—44 to 48 inches; brown (10YR 4/3) gravelly sandy loam; massive; very friable; few roots; 20 percent rock fragments; neutral; clear wavy boundary.

2C4—48 to 60 inches; brown (10YR 4/3), stratified gravel and loamy sand; single grained; loose; few roots; 40 percent rock fragments; slightly acid.

The thickness of the solum ranges from 18 to 40 inches. The content of rock fragments ranges from 0 to 35 percent in the solum and from 0 to 60 percent in the substratum. Reaction ranges from strongly acid to neutral in the solum and from moderately acid to mildly alkaline in the substratum.

The A horizon has hue of 7.5YR to 2.5Y, value of 3 to 5, and chroma of 2 to 4. The texture ranges from fine sandy loam to silt loam. Structure is weak or moderate granular. Consistence is very friable or friable.

The B horizon has hue of 7.5YR to 2.5Y, value of 3 to 5, and chroma of 2 to 4. The texture ranges from fine sandy loam to silt loam. Structure is weak or moderate subangular blocky, prismatic, or granular. Consistence is very friable or friable.

The C horizon has hue of 7.5YR to 2.5Y, value of 3 to 5, and chroma of 2 to 4. The texture ranges from loamy sand to silt loam. Consistence is loose to friable. The horizon is single grained or massive.

Tor Series

The Tor series consists of shallow, somewhat poorly drained and poorly drained soils on bedrock-controlled till plains in the mountainous parts of the county. These soils formed in a thin mantle of glacial till over bedrock. Slope ranges from 0 to 3 percent.

Tor soils are in a drainage sequence with the shallow, somewhat excessively drained to moderately well drained Halcott soils. Tor soils and Vly, Onteora, and Elka soils are on similar landscapes. Vly soils are 20 to 40 inches deep to bedrock. Onteora soils have a fragipan. Elka soils are well drained and very deep.

Typical pedon of Tor flaggy loam, in Jewett, 0.1 mile southwest of County Route 17, on the right side of Rice Street:

Oi—2 inches to 0; roots and twigs.

A—0 to 5 inches; dark brown (7.5YR 3/2) flaggy loam; weak fine granular structure; very friable; many fine and medium roots; 25 percent rock fragments; strongly acid; clear wavy boundary.

Bw—5 to 17 inches; dark reddish gray (5YR 4/2) very flaggy loam; few fine distinct brown and dark brown (7.5YR 4/2) mottles; weak fine subangular blocky structure; friable; many medium and fine roots; 50 percent rock fragments; strongly acid; clear wavy boundary.

C—17 to 19 inches; dark reddish gray (5YR 4/2) very flaggy loam; weak medium platy structure; firm; few fine roots; 50 percent rock fragments; strongly acid; clear smooth boundary.

R—19 inches; red and olive, fractured, massive sandstone.

The thickness of the solum ranges from 10 to 16 inches, and the depth to bedrock ranges from 10 to 20 inches. The content of rock fragments ranges from 15 to 35 percent in the A horizon and from 35 to 50 percent below the A horizon. In unlimed areas reaction is strongly acid to extremely acid throughout the profile.

The A horizon has hue of 5YR to 2.5Y, value of 3 to 5, and chroma of 1 to 3. It is loam or silt loam in the fine-earth fraction. Structure is weak or moderate granular. Consistence is very friable or friable. Some pedons have an E horizon, which is gray sandy loam.

The B horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of mainly 2 or 3 and is mottled. Faces of peds have chroma of 2 or less if the matrix chroma is more than 2. The horizon is silt loam, loam, or very fine sandy loam in the fine-earth fraction. Structure is weak or moderate, fine or medium, and subangular blocky or prismatic. Consistence is friable or firm.

The C horizon has color and texture similar to those of the B horizon. It has platy structure or is massive.

Tuller Series

The Tuller series consists of shallow, somewhat poorly drained and poorly drained soils on bedrock-controlled till plains in the central and eastern parts of the county. These soils formed in a thin mantle of glacial till over bedrock. Slope ranges from 0 to 3 percent.

Tuller soils are in a drainage sequence with the well drained Lordstown soils, the well drained and somewhat excessively drained Oquaga soils, and the somewhat excessively drained to moderately well drained Arnot soils. Tuller soils are associated with the very deep Nunda, Burdett, and Lyons soils.

Typical pedon of Tuller channery silt loam, in Greenville, 300 feet south of Hillcrest Road, 0.2 mile west of Springvalley Road:

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) channery silt loam; weak fine granular structure; very friable; many fine roots; 15 percent rock fragments; strongly acid; abrupt smooth boundary.

Bw—9 to 14 inches; dark grayish brown (2.5Y 4/2) channery silt loam; common medium distinct brown (7.5YR 4/4) and many medium distinct strong brown (7.5Y 5/6) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; friable; common fine roots; common fine pores; 15 percent rock fragments; moderately acid; clear wavy boundary.

R—14 inches; gray, massive sandstone.

The thickness of the solum and the depth to bedrock range from 10 to 20 inches. Rock fragments are dominantly flat. Their content ranges from 15 to 35 percent. In unlimed areas reaction ranges from very strongly acid to moderately acid throughout the profile.

The A horizon has hue of 7.5YR to 2.5Y, value of 3 to 5, and chroma of 2 or 3. The texture is loam or silt loam in the fine-earth fraction. Structure is weak or moderate, fine or medium granular. Consistence is very friable or friable.

The B horizon has hue of 5YR to 5Y, value of 4 to 6, and chroma of mainly 2 or 3. It has few to many mottles with chroma of 2 or less. The texture is silt loam, loam, or very fine sandy loam in the fine-earth fraction. Structure is subangular blocky, prismatic, or platy. Consistence is friable or firm.

Some pedons have a thin C horizon of gray, mottled, coarser textured material. The underlying bedrock ranges from massive sandstone to interbedded sandstone, siltstone, and shale. It is reddish, olive, or gray.

Tunkhannock Series

The Tunkhannock series consists of very deep, well drained and somewhat excessively drained soils formed in stratified sand and gravel. These soils are on outwash terraces, kames, and valley trains in the area of the Catskill Mountains. Slope ranges from 0 to 45 percent.

Tunkhannock soils are associated with Barbour and Basher soils, which are on nearby flood plains, and Lackawanna, Wellsboro, and Morris soils, which formed in nearby areas of deep glacial till.

Typical pedon of Tunkhannock gravelly loam, 0 to 3 percent slopes, in Cairo, 0.1 mile south of the junction of County Route 31 and H.M. Chadderdon Street, and 250 feet south of County Route 31:

Ap—0 to 7 inches; dark brown (7.5YR 3/2) gravelly loam; weak fine granular structure; very friable; many fine roots; 25 percent rock fragments; strongly acid; abrupt smooth boundary.

Bw1—7 to 13 inches; reddish brown (5YR 5/4) very gravelly loam; weak fine granular structure; very friable; many fine roots; 35 percent rock fragments; strongly acid; clear wavy boundary.

Bw2—13 to 19 inches; brown (7.5YR 4/4) very gravelly loam; weak fine granular structure; very friable; common fine roots; 40 percent rock fragments; moderately acid; clear wavy boundary.

Bw3—19 to 25 inches; reddish brown (5YR 4/4) very gravelly loam; weak fine granular structure; very friable; few fine roots; 55 percent rock fragments; strongly acid; clear wavy boundary.

2C—25 to 60 inches; brown (7.5YR 4/2), stratified extremely gravelly sand; mainly fine gravel; single grained; loose; few fine roots; 70 percent rock fragments; strongly acid.

The thickness of the solum ranges from 24 to 40 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges from 15 to 60 percent in the B horizon and from 40 to 80 percent in the C horizon. Reaction is extremely acid to moderately acid throughout the profile.

The Ap horizon has hue of 5YR to 10YR, value of 3 to 5, and chroma of 2 or 3. The texture is silt loam, loam, or sandy loam in the fine-earth fraction.

The B horizon has hue of 2.5YR to 7.5YR, value of 4 or 5, and chroma of 3 to 6. The texture of the fine-earth fraction is silt loam, loam, or sandy loam.

The C horizon has hue of 2.5YR to 10YR. The texture is sandy loam, loamy sand, or sand in the fine-earth fraction.

Udifluvents

Udifluvents are very deep, excessively drained to moderately well drained soils that formed in recent alluvial deposits. These soils are adjacent to streams and are subject to frequent flooding.

Udifluvents are mapped with Fluvaquents. They are slightly higher on the landscape than Fluvaquents.

Udifluvents commonly are near Tioga, Middlebury, Barbour, and Basher soils but are in areas where the adjacent stream, through scouring, cutting, and lateral erosion, frequently shifts the soil material from place to place.

Because of the variability of Udifluvents, a typical pedon is not provided. Below the A horizon the soils generally are stratified. The content of organic carbon decreases with increasing depth. The depth to bedrock is generally more than 5 feet. The content of coarse fragments is mainly less than 35 percent, but strata of very gravelly or sandy material are along some streams. The soils are very strongly acid to neutral throughout.

The A horizon has hue of 5YR to 10YR or is neutral in hue. It has value of 2 to 5 and chroma of 0 to 4. The texture is fine sandy loam to silt loam or their gravelly or channery analogs.

The C horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 2 to 6. The texture generally is sandy loam to silt loam or their gravelly analogs. In some pedons, however, the horizon is very coarse sand to fine sand. Consistence is friable to loose.

Udipsamments

Udipsamments consist of very deep, excessively drained to well drained soils on and near the banks of the Hudson River. These are sandy soils dredged from the river. Slope ranges from 5 to 16 percent.

Because of the variability of Udipsamments, a typical pedon is not provided. The solum consists of an A horizon 1 to 6 inches thick. The depth to bedrock is more than 60 inches. Rock fragments, mainly pebbles, make up 0 to 20 percent, by volume, of individual horizons. Reaction ranges from strongly acid to neutral throughout the profile.

The A horizon has hue of 10YR to 2.5Y, value of 3 to 5, and chroma of 2 or 3. The texture is very fine sand to coarse sand or their gravelly analogs. Structure is weak granular. Consistence is very friable.

The C horizon has hue of 10YR to 2.5Y, value of 3 to 6, and chroma of 3 to 5. The texture ranges from fine sand to coarse sand. The horizon is single grained. Consistence is loose.

Udorthents

Udorthents consist of excessively drained to moderately well drained soils formed in areas that have been cut and filled. These soils commonly are near construction sites or urban developments. Slope ranges from 0 to 8 percent.

Because of the variability of Udorthents, a typical pedon is not provided. The solum consists of an A horizon 1 to 8 inches thick. The depth to bedrock is more than 60 inches. Rock fragments, mainly gravel, shale, and cobblestones, make up 0 to 70 percent, by volume, of individual subhorizons. Reaction ranges from very strongly acid to moderately alkaline throughout the profile.

The A horizon generally has hue of 2.5YR to 5Y or is neutral in hue. It has value of 2 to 5 and chroma of 0 to 4. The texture is sandy loam to silty clay loam or their gravelly or very gravelly analogs.

The C horizon has hue of 2.5YR to 5Y or is neutral in hue. It has value of 2 to 6 and chroma of 0 to 6. The texture is sandy loam to silty clay loam or their gravelly, cobbly, or very gravelly analogs. The horizon has very weak structure or no structure. Consistence is friable to very firm, depending on the degree of soil compaction and the texture.

Valois Series

The Valois series consists of very deep, well drained soils on glacial till plains throughout the county. These soils are on valley walls and foothills adjacent to areas of glacial outwash. They formed in glacial till dominated by material derived from sandstone and shale. Slope ranges from 3 to 50 percent.

Valois soils are associated on the landscape with Chenango and Tunkhannock soils, which formed in sandy and gravelly outwash, and Mardin, Lackawanna, and Wellsboro soils, which have a fragipan and formed in glacial till. Valois soils are near Nunda and Burdett soils, which have a clayey subsoil.

Typical pedon of Valois gravelly loam, rolling, in Greenville, 50 feet west of County Road 35, about 0.5 mile north of its intersection with Town Road 7:

Ap—0 to 8 inches; dark brown (10YR 4/3) gravelly loam; weak fine granular structure; friable; many fine roots; 15 percent rock fragments; very strongly acid; clear smooth boundary.

Bw1—8 to 14 inches; dark yellowish brown (10YR 4/6) gravelly loam; weak fine subangular blocky structure; friable; few fine roots; 15 percent rock fragments; strongly acid; clear wavy boundary.

Bw2—14 to 34 inches; olive brown (2.5Y 4/4) gravelly loam; very weak fine subangular blocky structure; friable; few fine roots; 30 percent rock fragments; strongly acid; clear wavy boundary.

C—34 to 60 inches; olive brown (2.5Y 4/4) gravelly silt loam; weak medium platy structure; firm; 30 percent rock fragments; moderately acid.

The thickness of the solum ranges from 30 to 70 inches. The depth to bedrock is more than 60 inches.

The content of rock fragments ranges from 5 to 35 percent in the upper part of the solum, from 20 to 35 percent in the lower part of the solum, and from 30 to 70 percent in the substratum. Reaction ranges from extremely acid to moderately acid in the solum and from very strongly acid to neutral in the substratum.

The Ap horizon has hue of 7.5YR to 2.5Y, value of 3 or 4, and chroma of 2 or 3. The texture ranges from sandy loam to silt loam in the fine-earth fraction. Structure is weak or moderate granular. Consistence is friable or very friable.

The B horizon has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 3 to 6. The texture ranges from sandy loam to silt loam in the fine-earth fraction. Structure is weak or moderate granular or blocky. Consistence is friable or very friable.

The C horizon has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 2 to 4. The texture is silt loam to sandy loam in the fine-earth fraction. Structure is granular or platy, or the horizon is massive. Consistence is friable or firm.

Vergennes Series

The Vergennes series consists of very deep, moderately well drained soils that formed in lakebed and marine deposits on dissected lake plains. Slope ranges from 3 to 50 percent.

Vergennes soils are in a drainage sequence with the somewhat poorly drained Rhinebeck and Kingsbury soils and the poorly drained Covington soils. Vergennes soils are near Elmridge and Shaker soils, which have deposits of sandy material 20 to 40 inches deep over clayey material.

Typical pedon of Vergennes loam, in an area of Hudson and Vergennes soils, 3 to 8 percent slopes; in the Sleepy Hollow Development in Coxsackie, 0.1 mile east of County Route 57, about 300 feet north on a gravel road, 100 feet east in a meadow:

Ap—0 to 10 inches; dark brown (10YR 4/3) loam; weak medium granular structure; friable; common fine and medium roots; moderately acid; clear smooth boundary.

E—10 to 17 inches; grayish brown (2.5Y 5/2) clay loam; moderate medium platy structure parting to weak fine subangular blocky; friable; common medium tubular pores; common fine roots; moderately acid; clear wavy boundary.

BE—17 to 26 inches; brown (10YR 5/3) clay (B part); pale brown (10YR 6/3) coatings more than 1 millimeter thick (E part); many fine and medium distinct strong brown (7.5YR 5/6) and common fine distinct light olive brown (2.5Y 5/6) mottles; moderate medium and coarse angular blocky structure; firm; common fine and medium vesicular and tubular pores; few fine and medium roots; moderately acid; gradual wavy boundary.

Bt—26 to 34 inches; brown (10YR 4/3) clay; few fine distinct light brownish gray (10YR 6/2), many fine and medium faint dark yellowish brown (10YR 4/4), and common fine distinct strong brown (7.5YR 5/6) mottles; weak very coarse prismatic structure parting to moderate medium and coarse angular blocky; firm; thick clay films in tubular pores and many prominent brown (10YR 5/3) clay films on faces of peds; common fine vesicular and tubular pores; few fine roots; slightly acid; gradual wavy boundary.

C1—34 to 47 inches; variegated grayish brown (10YR 5/2), light yellowish brown (2.5Y 6/4), and dark brown (7.5YR 4/4) silty clay; common fine distinct yellowish brown (10YR 5/4) mottles; gray (10YR 5/2) prism faces; weak very coarse prismatic structure parting to weak medium and thick platy; firm; few fine and medium tubular pores; few fine roots along prism faces; neutral; gradual wavy boundary.

C2—47 to 60 inches; variegated grayish brown (10YR 5/2), light yellowish brown (2.5Y 6/4), and brown (10YR 4/3), varved silty clay and silty clay loam; 5 percent of the varves are very fine sandy loam and 10 percent are silt loam; moderate medium and thick platy (varved) structure; firm; many white (10YR 8/2) secondary calcium carbonate bodies; strongly effervescent; mildly alkaline.

The thickness of the solum ranges from 20 to 60 inches. The content of rock fragments ranges from 0 to 25 percent in the surface layer and subsurface layer and from 0 to 10 percent below the subsurface layer. The depth to carbonates ranges from 20 to 70 inches.

The Ap horizon has hue of 7.5YR to 2.5Y, value of 2 to 4, and chroma of 2 or 3. The texture of the fine-earth fraction ranges from loam to silty clay loam. Structure is granular or subangular blocky. Consistence is friable or very friable. Reaction ranges from strongly acid to neutral.

The E horizon has hue of 7.5YR to 5Y, value of 5 or 6, and chroma of 2 or 3. The texture of the fine-earth fraction ranges from silty clay loam to clay loam. Structure is subangular blocky or platy. Consistence is very friable to firm. Reaction ranges from strongly acid to neutral.

The Bt horizon has hue of 7.5YR to 5Y, value of 3 to 6, and chroma of 2 to 4. High- and low-chroma mottles

are common. The texture of the fine-earth fraction is clay. Structure is angular or subangular blocky with or without coarse or very coarse prisms. Consistence is firm or very firm. Reaction is strongly acid to neutral.

The C horizon has hue of 5YR to 5Y, value of 3 to 5, and chroma of 1 to 3. The fine-earth fraction is clay to silty clay loam. The horizon is massive or has platy structure. Reaction is neutral to moderately alkaline.

Vly Series

The Vly series consists of moderately deep, well drained and somewhat excessively drained soils that formed in red glacial till derived from sandstone, siltstone, and shale. These soils are on thinly mantled uplands in the area of the Catskill Mountains. Slope ranges from 3 to 55 percent.

Vly soils are associated on the landscape with the shallow, somewhat excessively drained and well drained Halcott soils and the shallow, somewhat poorly drained and poorly drained Tor soils. Vly soils are near the very deep Lewbeach and Willowemoc soils in areas where the mantle of till is thicker.

Typical pedon of Vly very channery silt loam, in an area of Vly-Halcott complex, hilly, very rocky; in Windham, 75 feet west of New Development Road, 300 feet south of its junction with Barnum Road:

A—0 to 2 inches; dusky red (2.5YR 3/2) channery silt loam; weak fine granular structure; very friable; 25 percent rock fragments; many medium and fine roots; strongly acid; abrupt smooth boundary.

Bw1—2 to 11 inches; reddish brown (2.5YR 4/4) very channery loam; weak fine subangular structure; very friable; 35 percent rock fragments; common medium and fine roots; many medium tubular pores; strongly acid; gradual smooth boundary.

Bw2—11 to 21 inches; reddish brown (5YR 4/3) very channery loam; weak fine subangular blocky structure; 60 percent rock fragments; friable; few fine and medium roots; few medium tubular pores; very strongly acid; gradual smooth boundary.

Bw3—21 to 28 inches; reddish brown (2.5YR 4/4) very channery loam; few fine faint yellowish red (5YR 5/6) mottles directly above the bedrock; weak fine subangular blocky structure; few fine and medium roots; few fine tubular pores; 60 percent rock fragments; strongly acid; abrupt smooth boundary.

R—28 inches; dark reddish brown (2.5YR 3/4), thinly bedded sandstone.

The thickness of the solum and the depth to bedrock range from 20 to 40 inches. The content of rock fragments ranges from 20 to 35 percent in the surface layer and from 35 to 60 percent below the surface layer. Reaction is extremely acid to strongly acid throughout the profile.

The A horizon has hue of 5YR to 10YR, value of 3 or 4, and chroma of 2 or 3. It is channery or gravelly silt loam or loam. It has weak or moderate, fine or medium granular structure. Consistence is friable or very friable.

The Bw horizon has hue of 5YR or 2.5YR, value of 3 or 4, and chroma of 3 to 6. It is very channery or very gravelly loam or silt loam. It has weak fine subangular blocky or granular structure. Consistence is very friable or friable.

Some pedons have a C horizon. This horizon has hue of 5YR or 2.5YR and value and chroma of 3 or 4. It is very channery or very gravelly loam or silt loam. Consistence is very friable or friable.

Volusia Series

The Volusia series consists of very deep, somewhat poorly drained soils on uplands in the central and eastern parts of the county. These soils formed in deep glacial till derived mainly from shale, siltstone, and sandstone. Slope ranges from 0 to 15 percent.

Volusia soils are in a drainage sequence with the well drained Valois soils, the moderately well drained Mardin soils, and the poorly drained and very poorly drained Alden soils. Volusia soils are associated with Tuller and Lordstown soils, which have bedrock closer to the surface.

Typical pedon of Volusia channery loam, 3 to 8 percent slopes, in Greenville, 150 feet north of Johnny Cake Lane, 0.25 mile west of County Road 35, and about 0.5 mile east of Old Plank Road:

Ap—0 to 7 inches; dark brown (10YR 3/3) channery loam; weak medium granular structure; friable; many fine roots; 20 percent rock fragments; strongly acid; clear smooth boundary.

E—7 to 12 inches; olive gray (5Y 5/2) channery silt loam; common medium distinct light olive brown (2.5Y 5/4) mottles; weak fine subangular blocky structure; friable; common fine roots; many fine tubular pores; 20 percent rock fragments; moderately acid; abrupt smooth boundary.

Bx1—12 to 28 inches; olive brown (2.5Y 4/4) channery silt loam; few medium faint dark grayish brown (2.5Y 4/2) mottles; grayish brown (10YR 5/2) inner streaks between prisms with outer streaks along vertical faces of yellowish brown (10YR 5/6) prisms; clay linings in most pore openings; moderate very coarse prismatic structure; very firm; brittle; few fine

roots along vertical prism faces; few fine tubular pores; 20 percent rock fragments; moderately acid; gradual wavy boundary.

Bx2—28 to 60 inches; dark grayish brown (10YR 4/2) channery silt loam; few medium distinct light olive brown (2.5Y 5/6), common medium distinct light brown (2.5Y 5/6), and common medium distinct light brownish gray (2.5Y 6/2) mottles; bleached light gray (10YR 7/2) inner streaks with yellowish brown (10YR 5/6) borders between vertical faces of prisms; strong very coarse prismatic structure parting to moderate thick platy; very firm; dense and brittle; some clay patches in pore openings and along vertical prism faces; few fine tubular pores; moderately acid.

The thickness of the solum ranges from 40 to 72 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges from 10 to 30 percent in the solum and from 0 to 60 percent in the C horizon. Depth to the fragipan ranges from 10 to 20 inches. Unless the soils are limed, the solum is slightly acid to very strongly acid in the upper part and strongly acid to neutral in the lower part. The C horizon is moderately acid to moderately alkaline.

The Ap horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 2 or 3. It is loam or silt loam in the fine-earth fraction.

The E horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 2 or 3. It has common or many, distinct or prominent mottles. The texture is loam to silt loam in the fine-earth fraction.

The Bx horizon has hue of 10YR to 5Y, value of 3 to 5, and chroma of 2 to 4. It has faint or distinct mottles. It is dominantly loam or silt loam in the fine-earth fraction but ranges to clay loam or silty clay loam. It has very coarse prismatic structure parting to platy in some pedons. Clay films coat most pores and are in some depressions on vertical cleavage faces. Consistence is firm to extremely firm.

Wayland Series

The Wayland series consists of very deep, poorly drained and very poorly drained soils in level or depressional areas on flood plains. These soils formed in recent alluvium and are adjacent to streams throughout the county. Slope ranges from 0 to 3 percent.

Wayland soils are in a drainage sequence with the well drained Tioga and Barbour soils and the somewhat poorly drained Middlebury soils.

Typical pedon of Wayland silt loam, in Coxsackie, 500 feet north of New York Route 81, directly north of Potic Creek, 0.5 mile west of Earlton:

Ap—0 to 9 inches; very dark grayish brown (10YR 5/2) loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; common medium and fine roots; moderately acid; clear smooth boundary.

Bg1—9 to 20 inches; olive gray (5Y 5/2) silt loam; many medium prominent grayish brown (10YR 5/2) mottles; weak medium subangular blocky structure; firm; few fine roots; strongly acid; clear smooth boundary.

Bg2—20 to 29 inches; gray (N 5/0) silty clay loam; many medium prominent dark brown (10YR 4/3) mottles; weak medium subangular blocky structure; firm; very few fine roots; moderately acid; clear smooth boundary.

Cg—29 to 49 inches; light gray (N 6/0) silty clay loam; massive; firm; moderately acid; clear wavy boundary.

2C—49 to 60 inches; dark gray (N 4/0) gravelly loam; massive; 35 percent rock fragments; firm; moderately acid.

The depth to contrasting deposits is at least 36 inches. The depth to bedrock is more than 60 inches. Reaction ranges from strongly acid to mildly alkaline to a depth of 24 inches and from moderately acid to moderately alkaline below that depth. The content of rock fragments is less than 5 percent within a depth of 36 inches and 0 to 30 percent below that depth.

The A horizon has hue of 10YR to 2.5Y or is neutral in hue. It has value of 2 or 3 and chroma of 0 to 2. The texture is silt loam or silty clay loam. Structure is moderate or strong, fine to coarse granular.

The B horizon has hue of 7.5YR to 5Y or is neutral in hue. It has value of 3 to 6 and chroma of 0 to 2.

The C horizon has hue of 7.5YR to 5Y or is neutral in hue. It has value of 3 to 6 and chroma of 0 to 2. It has high-chroma mottles in some pedons. The texture is silt loam or silty clay loam.

The 2C horizon is similar to the C horizon but is coarser textured and has contrasting deposits in some pedons.

Wellsboro Series

The Wellsboro series consists of very deep, moderately well drained soils on till plains, mainly in the foothills of the Catskill Mountains. These soils formed in glacial till derived mainly from sandstone, siltstone, and shale. Slope ranges from 3 to 25 percent.

Wellsboro soils are in a drainage sequence with the

well drained Lackawanna soils and the somewhat poorly drained Morris soils. Wellsboro soils are associated with the moderately deep Oquaga soils and the shallow Arnot soils.

Typical pedon of Wellsboro channery loam, 8 to 15 percent slopes, in Durham, 675 feet north of Gulf School House Road, 0.9 mile northeast of its junction with Pratt Road, 0.25 mile west of Hulls Corners Road:

Ap—0 to 8 inches; dark brown (7.5YR 3/2) channery loam; weak fine granular structure; friable; many medium and fine roots; 15 percent rock fragments; moderately acid; clear smooth boundary.

Bw1—8 to 11 inches; brown (7.5YR 4/4) channery silt loam; weak fine subangular blocky structure; friable; common fine and few medium roots; common medium tubular pores; 15 percent rock fragments; strongly acid; clear wavy boundary.

Bw2—11 to 16 inches; brown (7.5YR 4/4) channery silt loam; moderate medium subangular blocky structure; friable; few fine and medium roots; 20 percent rock fragments; strongly acid; clear wavy boundary.

Bw3—16 to 20 inches; reddish brown (5YR 4/4) channery silt loam; common medium distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable; few coarse roots; common medium tubular pores; 20 percent rock fragments; strongly acid; clear smooth boundary.

Bx—20 to 60 inches; reddish brown (5YR 4/3) channery silt loam; few fine faint pinkish gray (5YR 6/2) and common medium distinct strong brown (7.5YR 5/6) mottles; outer polygon streaks of brownish yellow (10YR 6/6) and inner streaks of light brown (7.5YR 6/4); few faint clay films on prism faces; moderate medium platy structure parting to strong medium subangular blocky; few fine flattened roots along polygon faces; very firm; 25 percent rock fragments; moderately acid.

The thickness of the solum ranges from 40 to 75 inches. Depth to the fragipan ranges from 15 to 26 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges from 15 to 35 percent in the A horizon, from 5 to 35 percent in the Bw horizon, and from 15 to 50 percent in the Bx and C horizons. Reaction is very strongly acid to moderately acid throughout the profile.

The A horizon has hue of 5YR to 10YR, value of 2 to 4, and chroma of 2 or 3. The fine-earth fraction of the A and Bw horizons is loam, silt loam, or fine sandy loam. The part of the Bw horizon within a depth of 20 inches has hue of 2.5YR to 10YR, value of 4 or 5, and chroma of 3 to 6. In the part below a depth of 20 inches, the range in individual subhorizons includes chroma of 2. In some pedons gray or brown mottles are in the part of the Bw horizon below a depth of 12 inches.

The Bx horizon has hue of 10R to 5YR, value of 3 to 5, and chroma of 2 to 4. Some prism interiors are mottled gray or brown. The texture of the fine-earth fraction ranges from sandy loam to silt loam. The very coarse prism interiors of the fragipan generally are platy or blocky, but they are massive in some pedons.

Some pedons have a C horizon, which is similar in color and texture to the Bx horizon.

Willowemoc Series

The Willowemoc series consists of very deep, moderately well drained soils on glacial till plains in the uplands of the Catskill Mountains. These soils formed in deep glacial till derived from reddish sandstone, siltstone, and shale. Slope ranges from 3 to 25 percent.

Willowemoc soils are in a drainage sequence with the well drained Lewbeach soils and the somewhat poorly drained Onteora soils. Willowemoc soils are near the shallow Halcott and moderately deep Vly soils in areas of thinly mantled till.

Typical pedon of Willowemoc channery silt loam, 3 to 8 percent slopes, in Hunter, 1 mile east of the intersection of New York Route 23A and County Route 18, about 0.25 mile north of County Route 18:

Oi—1 inch to 0; leaf litter and branches.

Ap—0 to 6 inches; dark reddish brown (5YR 3/2) channery silt loam; weak fine granular structure; friable; many fine and medium roots; many medium and fine pores; 25 percent rock fragments; very strongly acid; clear wavy boundary.

Bw1—6 to 14 inches; reddish brown (5YR 4/4) channery loam; weak fine subangular blocky structure; friable; common fine roots; many fine pores; 20 percent rock fragments; very strongly acid; gradual wavy boundary.

Bw2—14 to 18 inches; reddish brown (5YR 4/3) channery loam; common fine distinct brown (7.5YR 5/4) and strong brown (7.5YR 5/6) mottles; weak fine subangular blocky structure; few fine roots; firm; common fine pores; 20 percent rock fragments; very strongly acid; clear wavy boundary.

Bw3—18 to 21 inches; reddish brown (5YR 4/4) channery loam; common fine distinct strong brown (7.5YR 5/8) mottles; weak fine subangular blocky structure; firm; few fine roots; 20 percent rock fragments; very strongly acid; clear smooth boundary.

Bx—21 to 60 inches; reddish brown (5YR 4/3) channery

loam; weak thick platy structure; very firm; brittle; very coarse prisms; clay films in some fine pores and on a few plate faces; thin, reddish gray (5YR 5/2) prism faces; 30 percent rock fragments; strongly acid.

The thickness of the solum ranges from 35 to 65 inches. The depth to bedrock is more than 60 inches. Depth to the fragipan ranges from 17 to 26 inches. The content of rock fragments, by volume, ranges from 5 to 35 percent in the A and Bw horizons and from 15 to 50 percent in the Bx and C horizons. Reaction is extremely acid to strongly acid in the solum and strongly acid or moderately acid in the C horizon.

The A horizon has hue of 5YR to 10YR, value of 2 to 4, and chroma of 1 to 3. It is silt loam to fine sandy loam in the fine-earth fraction. Structure is weak or moderate granular. Consistence is friable or very friable. Some pedons have an E horizon.

The Bw horizon has hue of 2.5YR to 7.5YR, value of 4 or 5, and chroma of 3 to 6. Mottles are in some part of the horizon below a depth of 12 inches. The texture is fine sandy loam, loam, or silt loam in the fine-earth fraction. Structure is weak or moderate.

The Bx horizon has hue of 2.5YR or 5YR, value of 3 to 5, and chroma of 2 to 4. It has gray or brown mottles in some pedons. Prism faces are weak red (2.5YR 5/2) to pale brown (10YR 6/3). The texture is sandy loam, fine sandy loam, or loam in the fine-earth fraction. Some prism interiors have platy or blocky structure, and some are massive.

Some pedons have a C horizon, which is similar in color and texture to the Bx horizon but does not have very coarse prisms and is slightly more friable.

Formation of the Soils

This section relates the factors of soil formation to the soils in Greene County. It also describes the processes of soil formation.

Factors of Soil Formation

Soils form through weathering and other physical and chemical processes that act on parent material *(7)*. The properties of the soil in any given area depend on the combination of soil-forming factors in the area. These factors are the physical and chemical composition of the parent material, climate, plant and animal life, topography, and time. The relative influence of each of these factors differs from place to place, and each modifies the effect of the other four. For example, relief and the composition of the parent material influence the effects of climate and plant and animal life. In some areas, however, only one factor is the dominant influence.

Parent Material

Parent material is the unconsolidated earthy mass in which soils form. It determines the mineralogical and physical composition of the soil and influences the chemical composition. It also influences the rate of the soil-forming processes.

Most of the soils in Greene County formed in deposits left as the result of glaciation. Glacial till is the most extensive kind of parent material. Less extensive are glaciolacustrine (lake-laid) sediments and glaciofluvial (outwash) deposits. Other soils have been forming in recent deposits of stream alluvium and in accumulations of organic matter.

Soils that formed in glacial till have a wide range of characteristics as a result of a heterogeneous mixture of rocks and soil particles. An argillic horizon and a substratum are common in the deeper soils. Nunda and Burdett soils formed in very deep deposits of glacial till. In some areas the mantle of till is moderately deep or shallow over bedrock. Lordstown, Nassau, and Arnot soils formed in these areas. The bedrock in Greene County includes sandstone, shale, and limestone. The deposits of till have a significant component of local bedrock.

Melting glacial ice carried enormous quantities of meltwater and sorted soil and rock debris. This sorted debris, or outwash, was redeposited as layers of sand and gravel on outwash plains, kames, eskers, and deltas. Chenango and Tunkhannock soils, which are commonly medium textured to coarse textured, are examples of soils that formed in outwash.

Many of the larger valleys at one time trapped glacial meltwater in glacial lakes. Most of the stone-free sediment deposited in the quiet lake waters was clayey and silty. Rhinebeck, Hudson, and Covington are examples of soils that formed in these fine textured to medium textured deposits.

In more recent times, overflowing streams have deposited fresh, dark alluvial material on flood plains. The soils forming in this alluvium are typically silty or loamy and show only weak evidence of profile development. Tioga and Basher soils are examples.

Mucky soils formed in organic deposits in low areas. Carlisle soils, for example, formed in the well decomposed remains of trees and other plants.

Topography

The shape of the land surface, or topography, is commonly called the lay of the land. Topography, the slope, and the position of the land surface in relation to the water table have had a great influence on soil formation in the county.

Soils that formed in convex, sloping areas where little runoff accumulates or where runoff is medium or rapid generally are well drained and have a bright colored, unmottled subsoil. Where moisture fronts are able to penetrate to an appreciable depth, the soils generally are deeply leached. In many areas, however, the soils are not deeply leached because much of the rainfall runs off the surface or moves laterally within the soils.

Level areas or slight depressions where the water table is at or near the surface for long periods of time are markedly wet. The evidence of this wetness is a thick, dark, organic surface layer and a strongly mottled or grayish subsoil.

Some soils are wet because they are in areas where water accumulates or is perched above an impervious layer in the soil profile. The permeability of the soil

material, as well as the length, steepness, and configuration of slopes, influences the kind of soils that form.

Local differences among soils are largely the result of differences in parent material and topography. The relationship between soils, landscape position, kind of parent material, and drainage is shown in table 19.

Climate

Climate, particularly temperature and precipitation, is one of the most influential soil-forming factors. It largely determines the kind of weathering processes that occur in the soil. It also affects the growth and kind of plants and the leaching and translocation of weathered material.

Greene County has a humid, temperate climate that tends to promote the development of moderately weathered, leached soils. The average temperature is higher in lowland areas and on south-facing slopes than it is at high elevations of the Catskill Mountains. This climatic variability causes differences among the soils. More detailed information about climate is given in the section "General Nature of the County."

Plant and Animal Life

Living organisms, including plants, animals, bacteria, and fungi, have important effects on soil formation. Vegetation is generally responsible for the amount of organic matter and nutrients in the soil and for the color and structure of the surface layer. Animals, such as earthworms and burrowing animals, help to keep the soil porous and permeable to air and water. Their waste products cause an aggregation of soil particles and improve soil structure. Bacteria and fungi decompose vegetation, thus releasing plant nutrients.

Greene County was originally under native forest of northern hardwoods and pines in varying proportions. Hardwoods take up large quantities of bases or nutrients and return much of this material as leaf litter to the surface each year. In contrast, pines and other conifers do not use large amounts of nutrients. Unlike pines and conifers, hardwoods retard the leaching process.

Human activities that influence changes in soils include clearing trees, cultivating the land, adding nutrients through applications of fertilizer, mixing some soil horizons by plowing, and accelerating erosion in many areas.

Time

Time is a passive but important soil-forming factor. The soils in Greene County formed in relatively young deposits. Most of the material was deposited after the last glacier retreated 10,000 to 15,000 years ago. All of the soils, however, have not reached the same stage of profile development. The degree of profile development reflects not only the age of a soil but also the influence of other factors.

Processes of Soil Formation

The factors and processes of soil formation result in the formation of different layers, or soil horizons. These horizons are apparent in a vertical cut known as a soil profile. The profile extends from the surface downward into material that the soil-forming processes have altered very little. Most soils have three major horizons—A, B, and C.

Several processes are involved in the formation of soil horizons. These include the accumulation of organic matter, the leaching of soluble salts and minerals, the translocation of silicate clay minerals, the reduction and transfer of iron, and the formation of compact layers in the subsoil *(9)*.

Organic matter accumulates as plant residue decomposes. This process supplies organic matter, darkens the surface layer, and helps to form the A horizon.

Such processes as the translocation of clay minerals aid in the development of distinct subsoil horizons, but first some of the lime and other soluble salts must be leached. The kinds of salt originally in the soil, the rate and depth of percolation, and soil texture are factors that affect leaching.

One of the most important processes affecting horizon development in some soils is the translocation of silicate clay minerals. The parent material determines the content of clay minerals, which varies from one horizon to another. Clay particles are eluviated, or moved downward, from the A horizon and illuviated, or redeposited, in the B horizon as clay films on the faces of peds, as linings along pores and root channels, and as coatings on some coarse fragments. In Hudson soils, for example, translocation has resulted in a higher content of clay in the B horizon than in the A horizon. In some soils considerable eluviation of clay minerals to the B horizon has resulted in the formation of an E horizon.

Gleying, or the reduction and transfer of iron compounds, occurs mainly in the more poorly drained soils. In poorly drained and very poorly drained soils, such as Alden and Madalin soils, a grayish subsoil indicates the reduction, removal, and transfer of iron in solution. In moderately well drained and somewhat poorly drained soils, such as Burdett, Busti, Tuller, and Tor soils, yellowish brown and reddish brown mottles indicate the segregation of iron compounds. In these

soils oxidation and some reduction have taken place.

Several well drained and moderately well drained soils in Greene County have strong brown, yellowish brown, or reddish brown horizons in the subsoil. These colors are mainly the result of thin coatings of iron oxides on sand and silt particles. A bright colored subsoil that has iron oxide coatings is commonly termed a color B horizon. It normally has subangular blocky structure, but little or no clay has been translocated from an overlying surface horizon. Chenango and Valois are examples of soils that have a color B horizon.

Some soils in Greene County, for example, Morris, Wellsboro, and Lackawanna soils, have a distinct fragipan in the subsoil. The fragipan is very firm and brittle when moist and very hard when dry. The development of the fragipan is not fully understood. Studies indicate that the swelling and shrinking occurring in alternating wet and dry periods may account for the packed soil particles, the low pore space, and the large prisms on polygonal particles of vertical cracks that are evident in most fragipans *(6)*. Clay, silica, and oxides of aluminum, the most likely agents, make the soil brittle and hard.

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Glossary

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Basal till. Compact glacial till deposited beneath the ice.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bench terrace. A raised, level or nearly level strip of earth constructed on or nearly on the contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Catena. A sequence, or "chain," of soils on a landscape that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Channery soil. A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a channer.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are:

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the

soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Drumlin. A low, smooth, elongated oval hill, mound, or ridge of compact glacial till. The longer axis is parallel to the path of the glacier and commonly has a blunt nose pointing in the direction from which the ice approached.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep. Accelerated erosion is much more rapid than geologic erosion, mainly as a result of human activities or the activities of other animals or as a result of a catastrophe in nature, for example, fire, that exposes the surface.

Esker (geology). A narrow, winding ridge of stratified gravelly and sandy drift deposited by a stream flowing in a tunnel beneath a glacier.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fine textured soil. Sandy clay, silty clay, or clay.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Glacial drift (geology). Pulverized and other rock material transported by glacial ice and then deposited. Also, the sorted and unsorted material deposited by streams flowing from glaciers.

Glacial outwash (geology). Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

Glacial till (geology). Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Glaciofluvial deposits (geology). Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur as kames, eskers, deltas, and outwash plains.

Glaciolacustrine deposits. Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial meltwater. Many deposits are interbedded or laminated.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is

an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric and the more decomposed sapric material.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. The major horizons are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, any plowed or disturbed surface layer.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is in part a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) granular, prismatic, or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Hard, consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. Some soils are assigned to two hydrologic groups.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Kame (geology). An irregular, short ridge or hill of stratified glacial drift.

Lacustrine deposit (geology). Material deposited in

lake water and exposed when the water level is lowered or the elevation of the land is raised.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Moraine (geology). An accumulation of earth, stones, and other debris deposited by a glacier. Some types are terminal, lateral, medial, and ground.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent.* The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Muck. Dark colored, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Outwash plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it is generally low in relief.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil, adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the

same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Rill. A steep-sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rippable. Bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 draw bar horsepower rating.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the substratum. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of

climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the substratum. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from about 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Surface soil. The A, E, AB, and EB horizons. It includes all subdivisions of these horizons.

Terminal moraine. A belt of thick glacial drift that generally marks the termination of important glacial advances.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Till plain. An extensive area of nearly level to undulating soils underlain by glacial till.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Varve. A sedimentary layer of a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded glaciolacustrine layers seasonally deposited, usually by meltwater streams, in a glacial lake or other body of still water in front of a glacier.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1963-79 at Freehold, New York)

Month	Temperature: Average daily maximum	Temperature: Average daily minimum	Temperature: Average	Temperature: 2 years in 10 will have-- Maximum temperature higher than--	Temperature: 2 years in 10 will have-- Minimum temperature lower than--	Temperature: Average number of growing degree days*	Precipitation: Average	Precipitation: 2 years in 10 will have-- Less than--	Precipitation: 2 years in 10 will have-- More than--	Precipitation: Average number of days with 0.10 inch or more	Precipitation: Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January-----	31.5	11.5	21.5	59	-19	15	2.67	1.03	4.03	6	14.7
February----	34.3	14.2	24.3	59	-17	0	2.60	1.15	3.83	5	15.5
March-------	43.6	23.7	33.7	73	0	29	2.97	2.02	3.83	6	11.9
April-------	57.4	32.7	45.1	86	15	186	2.25	1.56	2.88	5	1.8
May---------	69.7	43.2	56.5	90	27	512	3.28	1.56	4.75	7	.3
June--------	77.8	53.0	65.4	93	35	762	3.40	1.42	5.07	7	.0
July--------	82.3	57.3	69.8	97	43	924	2.49	1.70	3.21	5	.0
August------	80.0	55.7	67.9	96	33	865	3.39	1.61	4.63	6	.0
September---	72.0	48.4	60.2	90	29	606	3.13	1.37	4.62	6	.0
October-----	61.5	37.2	49.4	80	18	301	2.80	.99	4.29	4	.0
November----	48.5	30.4	39.5	73	10	87	3.91	1.44	5.96	6	5.3
December----	35.4	18.9	27.2	64	-12	7	3.85	2.14	5.35	7	18.0
Yearly:											
Average---	57.8	35.5	46.7	---	---	---	---	---	---	---	---
Extreme---	---	---	---	97	-24	---	---	---	---	---	---
Total-----	---	---	---	---	---	4,294	36.74	28.85	44.09	70	67.5

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (40 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

(Recorded in the period 1963-79 at Freehold, New York)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Apr. 22	May 16	May 26
2 years in 10 later than--	Apr. 19	May 11	May 22
5 years in 10 later than--	Apr. 13	May 2	May 15
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 12	Oct. 4	Sept. 23
2 years in 10 earlier than--	Oct. 16	Oct. 9	Sept. 26
5 years in 10 earlier than--	Oct. 24	Oct. 17	Oct. 1

TABLE 3.--GROWING SEASON

(Recorded in the period 1963-79 at Freehold, New York)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	179	152	123
8 years in 10	184	157	128
5 years in 10	193	168	139
2 years in 10	202	178	150
1 year in 10	207	183	155

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
Ad	Alden silt loam	415	0.1
Am	Alden silt loam, very stony	196	*
ArA	Arnot channery silt loam, 0 to 3 percent slopes	168	*
ArB	Arnot channery silt loam, 3 to 8 percent slopes	6,460	1.5
ArC	Arnot channery silt loam, 8 to 15 percent slopes	561	0.1
AsC	Arnot-Lordstown channery silt loams, rolling	9,345	2.2
AsD	Arnot-Lordstown channery silt loams, 15 to 25 percent slopes	986	0.2
AsE	Arnot-Lordstown channery silt loams, 25 to 45 percent slopes	262	0.1
AuC	Arnot-Lordstown channery silt loams, 3 to 15 percent slopes, rocky	11,462	2.7
AvD	Arnot-Lordstown channery silt loams, 15 to 35 percent slopes, very rocky	6,240	1.5
AvF	Arnot-Lordstown channery silt loams, 35 to 55 percent slopes, very rocky	861	0.2
AwC	Arnot-Oquaga complex, rolling	3,537	0.8
AwD	Arnot-Oquaga complex, 15 to 25 percent slopes	487	0.1
AwE	Arnot-Oquaga complex, 25 to 45 percent slopes	224	0.1
Ba	Barbour loam	4,427	1.1
Bs	Basher silt loam	889	0.2
BuA	Burdett channery silt loam, 0 to 3 percent slopes	586	0.1
BuB	Burdett channery silt loam, 3 to 8 percent slopes	4,858	1.2
BuC	Burdett channery silt loam, 8 to 15 percent slopes	833	0.2
BvC	Burdett channery silt loam, 3 to 15 percent slopes, very stony	1,847	0.4
BwB	Busti silt loam, 3 to 8 percent slopes	1,434	0.3
Ca	Canandaigua silt loam	489	0.1
Cc	Carlisle muck	840	0.2
ChB	Chautauqua loam, 3 to 8 percent slopes	209	0.1
ChC	Chautauqua loam, 8 to 15 percent slopes	237	0.1
CnA	Chenango gravelly loam, 0 to 3 percent slopes	187	*
CnB	Chenango gravelly loam, 3 to 8 percent slopes	517	0.1
CnC	Chenango gravelly loam, rolling	522	0.1
Co	Covington and Madalin soils	2,170	0.5
Du	Dumps, landfill	63	*
ElB	Elka channery loam, 3 to 8 percent slopes	455	0.1
ElC	Elka channery loam, 8 to 15 percent slopes	584	0.1
ElD	Elka channery loam, 15 to 25 percent slopes	494	0.1
EmC	Elka channery loam, rolling, very stony	13,678	3.3
EmD	Elka channery loam, hilly, very stony	16,468	4.0
EmF	Elka channery loam, very steep, very stony	2,805	0.7
EnA	Elmridge very fine sandy loam, 0 to 3 percent slopes	766	0.2
EnB	Elmridge very fine sandy loam, 3 to 8 percent slopes	586	0.1
FaC	Farmington gravelly silt loam, rolling, rocky	1,989	0.5
FaD	Farmington gravelly silt loam, hilly, rocky	2,870	0.7
FaE	Farmington gravelly silt loam, steep, rocky	1,677	0.4
Fu	Fluvaquents-Udifluvents complex, frequently flooded	5,069	1.2
GfB	Galway-Farmington gravelly silt loams, 2 to 8 percent slopes, rocky	1,128	0.3
GfC	Galway-Farmington gravelly silt loams, rolling, rocky	652	0.2
GfD	Galway-Farmington gravelly silt loams, hilly, rocky	218	0.1
HaB	Halcott channery silt loam, 3 to 8 percent slopes	596	0.1
HaC	Halcott channery silt loam, 8 to 15 percent slopes	216	0.1
HlC	Halcott-Vly complex, rolling	2,915	0.7
HlD	Halcott-Vly complex, 15 to 25 percent slopes	735	0.2
HlE	Halcott-Vly complex, 25 to 45 percent slopes	257	0.1
HvB	Hudson and Vergennes soils, 3 to 8 percent slopes	2,568	0.6
HvC	Hudson and Vergennes soils, 8 to 15 percent slopes	1,025	0.2
HvE	Hudson and Vergennes soils, 25 to 50 percent slopes	921	0.2
HwC3	Hudson and Vergennes silty clay loams, 8 to 15 percent slopes, severely eroded	599	0.1
HwD3	Hudson and Vergennes silty clay loams, 15 to 25 percent slopes, severely eroded	2,269	0.5
KrA	Kingsbury and Rhinebeck soils, 0 to 3 percent slopes	5,866	1.4
KrB	Kingsbury and Rhinebeck soils, 3 to 8 percent slopes	3,490	0.8
LaB	Lackawanna channery loam, 3 to 8 percent slopes	594	0.1
LaC	Lackawanna channery loam, 8 to 15 percent slopes	1,581	0.4
LaD	Lackawanna channery loam, 15 to 25 percent slopes	1,823	0.4
LaE	Lackawanna channery loam, 25 to 35 percent slopes	316	0.1
LcC	Lackawanna and Wellsboro channery loams, 3 to 15 percent slopes, very stony	2,597	0.6

See footnote at end of table.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
LcD	Lackawanna and Wellsboro channery loams, 15 to 25 percent slopes, very stony	2,104	0.5
LeB	Lewbeach channery silt loam, 3 to 8 percent slopes	846	0.2
LeC	Lewbeach channery silt loam, 8 to 15 percent slopes	2,446	0.6
LeD	Lewbeach channery silt loam, 15 to 25 percent slopes	1,615	0.4
LeE	Lewbeach channery silt loam, 25 to 35 percent slopes	234	0.1
LfF	Lewbeach channery silt loam, 35 to 55 percent slopes, very stony	433	0.1
LgF	Lewbeach channery silt loam, very steep, very bouldery	2,770	0.7
LlC	Lewbeach and Willowemoc channery silt loams, 3 to 15 percent slopes, very stony	8,271	2.0
LlD	Lewbeach and Willowemoc channery silt loams, 15 to 35 percent slopes, very stony	5,928	1.4
LmC	Lewbeach and Willowemoc channery silt loams, strongly sloping, very bouldery	13,678	3.3
LmD	Lewbeach and Willowemoc channery silt loams, moderately steep, very bouldery	26,900	6.3
LoA	Lordstown channery silt loam, 0 to 3 percent slopes	210	0.1
LoB	Lordstown channery silt loam, 3 to 8 percent slopes	632	0.2
LoC	Lordstown channery silt loam, 8 to 15 percent slopes	220	0.1
LoD	Lordstown channery silt loam, 15 to 25 percent slopes	188	*
Lv	Lyons silt loam	1,709	0.4
Ly	Lyons silt loam, very stony	521	0.1
MaB	Maplecrest gravelly silt loam, 3 to 8 percent slopes	252	0.1
MaC	Maplecrest gravelly silt loam, rolling	772	0.2
MaD	Maplecrest gravelly silt loam, 15 to 25 percent slopes	248	0.1
MaE	Maplecrest gravelly silt loam, 25 to 45 percent slopes	225	0.1
MdB	Mardin gravelly silt loam, 3 to 8 percent slopes	1,400	0.3
MdC	Mardin gravelly silt loam, 8 to 15 percent slopes	1,443	0.3
MdD	Mardin gravelly silt loam, 15 to 25 percent slopes	636	0.2
MeC	Mardin gravelly silt loam, 3 to 15 percent slopes, very stony	2,061	0.5
Mf	Medisaprists, ponded	1,186	0.3
Mh	Medisaprists-Hydraquents complex, tidal marsh	1,075	0.3
Mk	Middlebury silt loam	422	0.1
MoA	Morris channery silt loam, 0 to 3 percent slopes	189	*
MoB	Morris channery silt loam, 3 to 8 percent slopes	856	0.2
MoC	Morris channery silt loam, 8 to 15 percent slopes	253	0.1
MpC	Morris channery silt loam, 3 to 15 percent slopes, very stony	744	0.2
NaC	Nassau channery silt loam, rolling	1,921	0.5
NrC	Nassau channery silt loam, rolling, very rocky	607	0.1
NrD	Nassau channery silt loam, hilly, very rocky	2,937	0.7
NrE	Nassau channery silt loam, steep, very rocky	571	0.1
NuB	Nunda silt loam, 3 to 8 percent slopes	1,098	0.3
NuC	Nunda silt loam, 8 to 15 percent slopes	1,867	0.4
NuD	Nunda silt loam, 15 to 25 percent slopes	1,297	0.3
NuE	Nunda silt loam, 25 to 35 percent slopes	317	0.1
NvC	Nunda silt loam, 3 to 15 percent slopes, very stony	1,150	0.3
NvE	Nunda silt loam, 15 to 35 percent slopes, very stony	1,444	0.3
Oc	Ochrepts, frequently flooded	722	0.2
OnB	Onteora silt loam, 3 to 8 percent slopes	1,016	0.2
OnC	Onteora silt loam, 8 to 15 percent slopes	496	0.1
OoC	Onteora silt loam, 3 to 15 percent slopes, very stony	3,616	0.9
OpC	Onteora silt loam, rolling, very bouldery	7,232	1.7
OrB	Oquaga very channery silt loam, 3 to 8 percent slopes	465	0.1
OrC	Oquaga very channery silt loam, 8 to 15 percent slopes	142	*
OrD	Oquaga very channery silt loam, 15 to 25 percent slopes	196	*
OsC	Oquaga-Arnot complex, 3 to 15 percent slopes, very rocky	5,254	1.3
OsD	Oquaga-Arnot complex, 15 to 35 percent slopes, very rocky	5,052	1.2
OsF	Oquaga-Arnot complex, 35 to 55 percent slopes, very rocky	1,677	0.4
Pg	Pits, gravel	148	*
Pr	Pits, quarry	901	0.2
RhA	Riverhead loam, 0 to 3 percent slopes	293	0.1
RhB	Riverhead loam, 3 to 8 percent slopes	418	0.1
RhC	Riverhead loam, rolling	774	0.2
RhD	Riverhead loam, hilly	225	0.1
Sh	Shaker very fine sandy loam	946	0.2
Su	Suny gravelly silt loam, very stony	769	0.2
Ta	Tioga loam	439	0.1
To	Tor flaggy loam	442	0.1

See footnote at end of table.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
Tr	Tor flaggy loam, very bouldery	1,163	0.3
Ts	Tuller channery silt loam	2,229	0.5
Tt	Tuller channery silt loam, very stony	777	0.2
TuA	Tunkhannock gravelly loam, 0 to 3 percent slopes	457	0.1
TuB	Tunkhannock gravelly loam, 3 to 8 percent slopes	1,548	0.4
TuC	Tunkhannock gravelly loam, rolling	1,246	0.3
TuD	Tunkhannock gravelly loam, hilly	335	0.1
TvB	Tunkhannock gravelly loam, fan, 3 to 8 percent slopes	2,885	0.7
TwE	Tunkhannock and Chenango gravelly loams, 25 to 45 percent slopes	687	0.2
Ud	Udipsamments, dredged	446	0.1
Ur	Udorthents, loamy	1,275	0.3
VaB	Valois gravelly loam, 3 to 8 percent slopes	688	0.2
VaC	Valois gravelly loam, rolling	2,432	0.6
VaD	Valois gravelly loam, 15 to 25 percent slopes	1,623	0.4
VaF	Valois gravelly loam, 25 to 60 percent slopes	786	0.2
VbE	Valois gravelly loam, 15 to 35 percent slopes, very stony	4,688	1.1
VbF	Valois gravelly loam, 35 to 50 percent slopes, very stony	231	0.1
VdB	Valois-Nassau complex, undulating	698	0.2
VdD	Valois-Nassau complex, hilly	4,185	1.0
VeB	Vly very channery silt loam, 3 to 8 percent slopes	547	0.1
VeC	Vly very channery silt loam, 8 to 15 percent slopes	414	0.1
VeD	Vly very channery silt loam, 15 to 25 percent slopes	390	0.1
VhC	Vly-Halcott complex, rolling, very rocky	13,646	3.3
VhD	Vly-Halcott complex, hilly, very rocky	43,164	10.3
VhF	Vly-Halcott complex, very steep, very rocky	47,713	11.4
VoA	Volusia channery loam, 0 to 3 percent slopes	144	*
VoB	Volusia channery loam, 3 to 8 percent slopes	1,104	0.3
VoC	Volusia channery loam, 8 to 15 percent slopes	120	*
VpC	Volusia channery silt loam, 3 to 15 percent slopes, very stony	440	0.1
Wa	Wayland silt loam	1,491	0.4
WeB	Wellsboro channery loam, 3 to 8 percent slopes	2,741	0.7
WeC	Wellsboro channery loam, 8 to 15 percent slopes	2,483	0.6
WeD	Wellsboro channery loam, 15 to 25 percent slopes	535	0.1
WmB	Willowemoc channery silt loam, 3 to 8 percent slopes	2,836	0.7
WmC	Willowemoc channery silt loam, 8 to 15 percent slopes	2,779	0.7
WmD	Willowemoc channery silt loam, 15 to 25 percent slopes	991	0.2
	Water	3,985	1.0
	Total	417,920	100.0

* Less than 0.1 percent.

TABLE 5.--PRIME FARMLAND

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name)

Map symbol	Soil name
Ba	Barbour loam
Bs	Basher silt loam
BuA	Burdett channery silt loam, 0 to 3 percent slopes (where drained)
BwB	Busti silt loam, 3 to 8 percent slopes (where drained)
ChB	Chautauqua loam, 3 to 8 percent slopes
CnA	Chenango gravelly loam, 0 to 3 percent slopes
CnB	Chenango gravelly loam, 3 to 8 percent slopes
ElB	Elka channery loam, 3 to 8 percent slopes
EnA	Elmridge very fine sandy loam, 0 to 3 percent slopes
EnB	Elmridge very fine sandy loam, 3 to 8 percent slopes
LaB	Lackawanna channery loam, 3 to 8 percent slopes
LeB	Lewbeach channery silt loam, 3 to 8 percent slopes
LoA	Lordstown channery silt loam, 0 to 3 percent slopes
LoB	Lordstown channery silt loam, 3 to 8 percent slopes
MaB	Maplecrest gravelly silt loam, 3 to 8 percent slopes
Mk	Middlebury silt loam
RhA	Riverhead loam, 0 to 3 percent slopes
RhB	Riverhead loam, 3 to 8 percent slopes
Sh	Shaker very fine sandy loam (where drained)
Ta	Tioga loam
TuA	Tunkhannock gravelly loam, 0 to 3 percent slopes
TuB	Tunkhannock gravelly loam, 3 to 8 percent slopes
TvB	Tunkhannock gravelly loam, fan, 3 to 8 percent slopes
VaB	Valois gravelly loam, 3 to 8 percent slopes

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability	Apples	Corn	Corn silage	Sweet corn	Grass-legume hay	Irish potatoes	Trefoil-grass hay
		Bu	Bu	Tons	Tons	Tons	Cwt	Tons
Ad------------- Alden	IVw	---	80	18	---	2.5	---	---
Am------------- Alden	VIIs	---	---	---	---	---	---	---
ArA------------ Arnot	IIIs	---	---	10	---	---	---	---
ArB------------ Arnot	IIIe	---	---	---	---	---	---	---
ArC------------ Arnot	IVe	---	---	---	---	---	---	---
AsC------------ Arnot-Lordstown	IVe	---	---	---	---	---	---	---
AsD------------ Arnot-Lordstown	VIe	---	---	---	---	---	---	---
AsE------------ Arnot-Lordstown	VIIs	---	---	---	---	---	---	---
AuC------------ Arnot-Lordstown	VIs	---	---	---	---	---	---	---
AvD, AvF-------- Arnot-Lordstown	VIIs	---	---	---	---	---	---	---
AwC------------ Arnot-Oquaga	IVe	---	80	12	---	2.1	---	---
AwD------------ Arnot-Oquaga	VIe	---	---	---	---	---	---	---
AwE------------ Arnot-Oquaga	VIIe	---	---	---	---	---	---	---
Ba------------- Barbour	I	---	150	20	10	4.0	450	---
Bs------------- Basher	IIw	---	120	17	---	3.5	360	---
BuA, BuB-------- Burdett	IIIw	---	85	12	---	2.5	---	---
BuC------------ Burdett	IIIe	---	75	10	---	2.5	---	---
BvC------------ Burdett	VIs	---	---	---	---	---	---	---
BwB------------ Busti	IIw	---	85	15	---	2.5	---	---

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS--Continued

Soil name and map symbol	Land capability	Apples	Corn	Corn silage	Sweet corn	Grass-legume hay	Irish potatoes	Trefoil-grass hay
		Bu	Bu	Tons	Tons	Tons	Cwt	Tons
Ca-------------- Canandaigua	IIIw	---	---	---	---	---	---	---
Cc-------------- Carlisle	Vw	---	---	---	---	---	---	---
ChB------------- Chautauqua	IIw	---	85	15	---	2.5	---	---
ChC------------- Chautauqua	IIIe	---	75	12	---	2.5	---	---
CnA, CnB-------- Chenango	IIs	---	120	---	---	4.0	400	---
CnC------------- Chenango	IIIe	---	100	---	---	4.0	---	---
Co-------------- Covington and Madalin	IVw	---	---	10	---	---	---	---
Du*. Dumps								
ElB------------- Elka	IIe	---	75	14	---	---	---	---
ElC------------- Elka	IIIe	---	70	12	---	---	---	---
ElD------------- Elka	IVe	---	---	---	---	---	---	---
EmC------------- Elka	VIs	---	---	---	---	---	---	---
EmD, EmF-------- Elka	VIIs	---	---	---	---	---	---	---
EnA, EnB-------- Elmridge	IIw	---	110	17	---	3.0	250	---
FaC, FaD-------- Farmington	VIs	---	---	---	---	---	---	---
FaE------------- Farmington	VIIs	---	---	---	---	---	---	---
Fu-------------- Fluvaquents-Udifluvents	Vw	---	---	---	---	---	---	---
GfB, GfC-------- Galway-Farmington	VIs	---	---	---	---	3.0	---	---
GfD------------- Galway-Farmington	VIs	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS--Continued

Soil name and map symbol	Land capability	Apples	Corn	Corn silage	Sweet corn	Grass-legume hay	Irish potatoes	Trefoil-grass hay
		Bu	Bu	Tons	Tons	Tons	Cwt	Tons
HaB------------- Halcott	IVs	---	---	---	---	---	---	---
HaC------------- Halcott	VIe	---	---	---	---	---	---	---
HlC------------- Halcott-Vly	VIe	---	---	---	---	---	---	---
HlD, HlE-------- Halcott-Vly	VIIe	---	---	---	---	---	---	---
HvB------------- Hudson and Vergennes	IIe	---	100	16	---	3.5	---	---
HvC------------- Hudson and Vergennes	IIIe	---	90	15	---	3.5	---	---
HvE------------- Hudson and Vergennes	VIIe	---	---	---	---	---	---	---
HwC3------------ Hudson and Vergennes	IVe	---	---	---	---	---	---	---
HwD3------------ Hudson and Vergennes	VIe	---	---	---	---	---	---	---
KrA------------- Kingsbury and Rhinebeck	IIIw	---	90	14	---	3.0	---	---
KrB------------- Kingsbury and Rhinebeck	IIIw	---	95	15	---	3.0	---	---
LaB------------- Lackawanna	IIe	---	110	16	---	4.0	---	---
LaC------------- Lackawanna	IIIe	---	95	14	---	4.0	---	---
LaD------------- Lackawanna	IVe	---	---	---	---	3.0	---	---
LaE------------- Lackawanna	VIe	---	---	---	---	---	---	---
LcC------------- Lackawanna and Wellsboro	VIs	---	---	---	---	---	---	---
LcD------------- Lackawanna and Wellsboro	VIIs	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS--Continued

Soil name and map symbol	Land capability	Apples	Corn	Corn silage	Sweet corn	Grass-legume hay	Irish potatoes	Trefoil-grass hay
		Bu	Bu	Tons	Tons	Tons	Cwt	Tons
LeB------------- Lewbeach	IIe	---	---	14	---	---	---	3.5
LeC------------- Lewbeach	IIIe	---	---	12	---	---	---	3.0
LeD------------- Lewbeach	IVe	---	---	---	---	---	---	2.5
LeE------------- Lewbeach	VIe	---	---	---	---	---	---	---
LfF------------- Lewbeach	VIIs	---	---	---	---	---	---	---
LgF------------- Lewbeach	VIIs	---	---	---	---	---	---	---
LlC, LlD, LmC, LmD------------ Lewbeach and Willowemoc	VIIs	---	---	---	---	---	---	---
LoA------------- Lordstown	IIs	---	85	14	---	3.0	---	---
LoB------------- Lordstown	IIe	550	85	14	---	3.0	---	---
LoC------------- Lordstown	IIIe	500	85	14	---	3.0	---	---
LoD------------- Lordstown	IVe	450	---	---	---	---	---	---
Lv-------------- Lyons	Vw	---	---	---	---	---	---	---
Ly-------------- Lyons	VIIs	---	---	---	---	---	---	---
MaB------------- Maplecrest	IIe	---	110	16	---	3.5	---	---
MaC------------- Maplecrest	IIIe	---	95	14	---	3.5	---	---
MaD------------- Maplecrest	IVe	---	---	---	---	3.0	---	---
MaE------------- Maplecrest	VIIe	---	---	---	---	---	---	---
MdB------------- Mardin	IIw	---	90	---	---	3.0	450	---
MdC------------- Mardin	IIIe	---	85	---	---	3.0	---	---
MdD------------- Mardin	IVe	---	80	---	---	3.0	---	---

See footnote at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS--Continued

Soil name and map symbol	Land capability	Apples	Corn	Corn silage	Sweet corn	Grass-legume hay	Irish potatoes	Trefoil-grass hay
		Bu	Bu	Tons	Tons	Tons	Cwt	Tons
MeC------------- Mardin	VIs	---	---	---	---	---	---	---
Mf-------------- Medisaprists	VIIIw	---	---	---	---	---	---	---
Mh-------------- Medisaprists-Hydraquents	VIIIw	---	---	---	---	---	---	---
Mk-------------- Middlebury	IIw	---	120	---	---	3.5	360	---
MoA, MoB-------- Morris	IIIw	---	80	---	---	3.0	---	---
MoC------------- Morris	IIIe	---	70	---	---	3.0	---	---
MpC------------- Morris	VIs	---	---	---	7	---	---	---
NaC------------- Nassau	IVe	---	---	---	---	2.0	---	---
NrC, NrD-------- Nassau	VIs	---	---	---	---	---	---	---
NrE------------- Nassau	VIIe	---	---	---	---	---	---	---
NuB------------- Nunda	IIe	---	90	14	---	3.0	---	---
NuC------------- Nunda	IIIe	---	85	12	---	2.5	---	---
NuD------------- Nunda	IVe	---	---	---	---	2.5	---	---
NuE------------- Nunda	VIe	---	---	---	---	---	---	---
NvC------------- Nunda	VIs	---	---	---	---	---	---	---
NvE------------- Nunda	VIIs	---	---	---	---	---	---	---
Oc. Ochrepts								
OnB------------- Onteora	IIIw	---	---	10	---	---	---	2.0
OnC------------- Onteora	IIIe	---	---	10	---	---	---	2.0
OoC, OpC-------- Onteora	VIs	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS--Continued

Soil name and map symbol	Land capability	Apples	Corn	Corn silage	Sweet corn	Grass-legume hay	Irish potatoes	Trefoil-grass hay
		Bu	Bu	Tons	Tons	Tons	Cwt	Tons
OrB: Oquaga	IIe	---	90	14	---	3.0	260	---
OrC: Oquaga	IIIe	---	80	14	---	3.0	---	---
OrD: Oquaga	IVe	---	---	---	---	---	---	---
OsC: Oquaga-Arnot	VIs	---	---	---	---	---	---	---
OsD, OsF: Oquaga-Arnot	VIIs	---	---	---	---	---	---	---
Pg*, Pr*. Pits								
RhA, RhB: Riverhead	IIs	---	110	15	---	4.0	450	---
RhC: Riverhead	IIIe	---	95	14	---	4.0	400	---
RhD: Riverhead	IVe	---	---	---	---	---	---	---
Sh: Shaker	IIIw	---	100	14	---	3.5	---	---
Su: Suny	VIIs	---	---	---	---	---	---	---
Ta: Tioga	I	---	---	---	---	3.5	450	---
To: Tor	IVw	---	---	---	---	---	---	---
Tr: Tor	IVw	---	---	---	---	---	---	---
Ts: Tuller	IVw	---	---	---	---	---	---	---
Tt: Tuller	VIIs	---	---	---	---	---	---	---
TuA, TuB: Tunkhannock	IIs	---	120	---	---	4.0	450	---
TuC: Tunkhannock	IIIe	---	100	---	---	4.0	---	---
TuD: Tunkhannock	IVe	---	---	---	---	---	---	---
TvB: Tunkhannock	IIs	---	110	---	---	4.0	400	---

See footnote at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS--Continued

Soil name and map symbol	Land capability	Apples	Corn	Corn silage	Sweet corn	Grass-legume hay	Irish potatoes	Trefoil-grass hay
		Bu	Bu	Tons	Tons	Tons	Cwt	Tons
TwE-------------- Tunkhannock and Chenango	VIIe	---	---	---	---	---	---	---
Ud. Udipsamments								
Ur. Udorthents								
VaB-------------- Valois	IIe	---	110	16	---	---	400	---
VaC-------------- Valois	IIIe	---	95	14	---	---	---	---
VaD-------------- Valois	IVe	---	---	---	---	---	---	---
VaF-------------- Valois	VIIe	---	---	---	---	---	---	---
VbE, VbF--------- Valois	VIIs	---	---	---	---	---	---	---
VdB-------------- Valois-Nassau	IIIe	---	82	12	---	---	---	---
VdD-------------- Valois-Nassau	IVe	---	---	---	---	---	---	---
VeB-------------- Vly	IIe	---	75	12	---	2.5	---	---
VeC-------------- Vly	IIIe	---	75	12	---	2.5	---	---
VeD-------------- Vly	IVe	---	---	---	---	---	---	---
VhC-------------- Vly-Halcott	VIs	---	---	---	---	---	---	---
VhD, VhF--------- Vly-Halcott	VIIs	---	---	---	---	---	---	---
VoA, VoB--------- Volusia	IIIw	---	80	12	---	---	---	---
VoC-------------- Volusia	IIIe	---	70	10	---	---	---	---
VpC-------------- Volusia	VIIs	---	---	---	---	---	---	---
Wa--------------- Wayland	Vw	---	---	---	---	---	---	---
WeB-------------- Wellsboro	IIw	---	90	---	---	3.0	---	---

See footnote at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS--Continued

Soil name and map symbol	Land capability	Apples	Corn	Corn silage	Sweet corn	Grass-legume hay	Irish potatoes	Trefoil-grass hay
		Bu	Bu	Tons	Tons	Tons	Cwt	Tons
WeC-------------- Wellsboro	IIIe	---	85	---	---	3.0	---	---
WeD-------------- Wellsboro	IVe	---	---	---	---	---	---	---
WmB-------------- Willowemoc	IIw	---	---	12	---	---	---	3.0
WmC-------------- Willowemoc	IIIe	---	---	12	---	---	---	2.5
WmD-------------- Willowemoc	IVe	---	---	---	---	---	---	---

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--CAPABILITY CLASSES AND SUBCLASSES

(Miscellaneous areas are excluded. Absence of an entry indicates no acreage)

Class	Total acreage	Major management concerns (Subclass)		
		Erosion (e)	Wetness (w)	Soil (s)
		Acres	Acres	Acres
I	4,866	---	---	---
II	24,509	8,145	9,849	6,515
III	51,307	29,210	21,231	866
IV	39,578	33,005	5,977	596
V	9,109	---	9,109	---
VI	80,509	15,224	---	65,285
VII	204,300	4,406	---	199,894
VIII	2,261	---	2,261	---

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Productivity class*	Trees to plant
Ad, Am---------- Alden	2W	Slight	Severe	Severe	Severe	Red maple-----------	50	2	White spruce, northern whitecedar.
ArA, ArB, ArC--- Arnot	3D	Slight	Slight	Severe	Moderate	Northern red oak---- Sugar maple--------- Eastern white pine-- White ash-----------	58 60 55 55	3 3 6 2	Eastern white pine, red pine.
AsC**:									
Arnot----------	3D	Slight	Slight	Severe	Moderate	Northern red oak---- Sugar maple--------- Eastern white pine-- White ash-----------	58 60 55 55	3 3 6 2	Eastern white pine, red pine.
Lordstown------	3A	Slight	Slight	Slight	Slight	Northern red oak---- Sugar maple--------- White ash----------- Eastern hemlock-----	62 73 75 ---	3 3 3 ---	Eastern white pine, European larch, red pine, Norway spruce.
AsD**:									
Arnot----------	3D	Slight	Moderate	Severe	Moderate	Northern red oak---- Sugar maple--------- Eastern white pine-- White ash-----------	58 60 55 55	3 3 6 2	Eastern white pine, red pine.
Lordstown------	3R	Slight	Moderate	Slight	Slight	Northern red oak---- Sugar maple--------- White ash-----------	62 73 75	3 3 3	Eastern white pine, European larch, red pine, Norway spruce.
AsE**:									
Arnot----------	3R	Moderate	Severe	Severe	Moderate	Northern red oak---- Sugar maple--------- Eastern white pine-- White ash-----------	55 50 55 55	3 2 6 2	Eastern white pine, red pine.
Lordstown------	3R	Moderate	Severe	Slight	Slight	Northern red oak---- Sugar maple--------- White ash-----------	66 73 75	3 3 3	Eastern white pine, European larch, red pine, Norway spruce.
AuC**:									
Arnot----------	3D	Slight	Slight	Severe	Moderate	Northern red oak---- Sugar maple--------- Eastern white pine-- White ash-----------	58 60 55 55	3 3 6 2	Eastern white pine, red pine.
Lordstown------	3A	Slight	Slight	Slight	Slight	Northern red oak---- Sugar maple--------- White ash-----------	62 73 75	3 3 3	Eastern white pine, European larch, red pine, Norway spruce.

See footnotes at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordi-nation symbol	Management concerns: Erosion hazard	Equip-ment limita-tion	Seedling mortal-ity	Wind-throw hazard	Potential productivity: Common trees	Site index	Produc-tivity class*	Trees to plant
AvD**:									
Arnot----------	3D	Slight	Moderate	Severe	Moderate	Northern red oak----	58	3	Eastern white pine, red pine.
						Sugar maple---------	60	3	
						Eastern white pine--	55	6	
						White ash-----------	55	2	
Lordstown------	3R	Slight	Moderate	Slight	Slight	Northern red oak----	62	3	Eastern white pine, European larch, red pine, Norway spruce.
						Sugar maple---------	73	3	
						White ash-----------	75	3	
AvF**:									
Arnot----------	3R	Moderate	Severe	Severe	Moderate	Northern red oak----	55	3	Eastern white pine, red pine.
						Sugar maple---------	50	2	
						Eastern white pine--	55	6	
						White ash-----------	55	2	
Lordstown------	3R	Moderate	Severe	Slight	Slight	Northern red oak----	66	3	Eastern white pine, European larch, red pine, Norway spruce.
						Sugar maple---------	73	3	
						White ash-----------	75	3	
AwC**:									
Arnot----------	3D	Slight	Slight	Severe	Moderate	Northern red oak----	58	3	Eastern white pine, red pine.
						Sugar maple---------	60	3	
						Eastern white pine--	55	6	
						White ash-----------	55	2	
Oquaga---------	4A	Slight	Slight	Slight	Slight	Northern red oak----	71	4	Eastern white pine, red pine, European larch, Norway spruce.
						Eastern white pine--	75	10	
						Sugar maple---------	69	3	
AwD**:									
Arnot----------	3D	Slight	Moderate	Severe	Moderate	Northern red oak----	58	3	Eastern white pine, red pine.
						Sugar maple---------	60	3	
						Eastern white pine--	55	6	
						White ash-----------	55	2	
Oquaga---------	4R	Slight	Moderate	Slight	Slight	Northern red oak----	71	4	Eastern white pine, red pine, European larch, Norway spruce.
						Eastern white pine--	75	10	
						Sugar maple---------	69	3	
AwE**:									
Arnot----------	3R	Moderate	Severe	Severe	Moderate	Northern red oak----	55	3	Eastern white pine, red pine.
						Sugar maple---------	50	2	
						Eastern white pine--	55	6	
						White ash-----------	55	2	
Oquaga---------	3R	Moderate	Severe	Slight	Slight	Sugar maple---------	69	3	Eastern white pine, red pine, European larch, Norway spruce.
						Northern red oak----	71	4	
						Eastern white pine--	75	10	

See footnotes at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Productivity class*	Trees to plant
Ba-------------- Barbour	3A	Slight	Slight	Slight	Slight	Sugar maple---------	70	3	Eastern white pine, Norway spruce, black walnut, northern red oak, black locust.
						Northern red oak----	80	4	
Bs-------------- Basher	3A	Slight	Slight	Slight	Slight	Sugar maple---------	70	3	Eastern white pine, Norway spruce, European larch.
						American basswood---	85	4	
						Red maple-----------	---	---	
BuA, BuB, BuC, BvC------------ Burdett	4W	Slight	Moderate	Moderate	Moderate	Northern red oak----	70	4	European larch, Norway spruce, white spruce, eastern white pine.
						Sugar maple---------	60	3	
BwB------------- Busti	3W	Slight	Moderate	Moderate	Moderate	Sugar maple---------	60	3	Eastern white pine, white spruce, Norway spruce, European larch.
						Northern red oak----	65	3	
						White ash-----------	---	---	
						Black cherry--------	---	---	
Ca-------------- Canandaigua	3W	Slight	Severe	Severe	Severe	Red maple-----------	65	3	
						Eastern white pine--	65	8	
Cc-------------- Carlisle	3W	Slight	Severe	Severe	Severe	Red maple-----------	74	3	
						White ash-----------	---	---	
						Green ash-----------	---	---	
						Quaking aspen-------	---	---	
						Swamp white oak-----	---	---	
						Silver maple--------	82	2	
ChB, ChC-------- Chautauqua	3A	Slight	Slight	Slight	Slight	Sugar maple---------	62	3	Eastern white pine, Norway spruce, white spruce, European larch, red pine, black locust, northern red oak.
						Northern red oak----	70	4	
						Black cherry--------	70	3	
						White ash-----------	70	3	
CnA, CnB, CnC--- Chenango	4A	Slight	Slight	Slight	Slight	Sugar maple---------	86	4	Eastern white pine, red pine, European larch, black locust, northern red oak.
						Northern red oak----	80	4	
						Hickory-------------	---	---	

See footnotes at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Productivity class*	Trees to plant
Co**:									
Covington	6W	Slight	Severe	Severe	Severe	Eastern white pine	55	6	White spruce, northern whitecedar, Norway spruce.
						White ash	67	3	
						Eastern red cedar	---	---	
						Red maple	---	---	
Madalin	2W	Slight	Severe	Severe	Severe	Red maple	50	2	Northern whitecedar, white spruce, Norway spruce.
						White ash	50	2	
ElB, ElC Elka	3A	Slight	Slight	Slight	Slight	Sugar maple	70	3	White spruce, Norway spruce, Douglas fir, red pine, European larch.
						Northern red oak	75	4	
						Red maple	75	3	
						American beech	70	3	
						Eastern white pine	75	10	
ElD Elka	3R	Slight	Moderate	Slight	Slight	Sugar maple	70	3	White spruce, Norway spruce, Douglas fir, balsam fir, red pine, European larch.
						Northern red oak	75	4	
						Red maple	75	3	
						American beech	70	3	
						Eastern white pine	75	10	
EmC Elka	3A	Slight	Slight	Slight	Slight	Sugar maple	70	3	White spruce, Norway spruce, red pine, balsam fir.
						Northern red oak	75	4	
						American beech	70	3	
						Eastern white pine	75	10	
						Red maple	75	3	
EmD Elka	3R	Slight	Moderate	Slight	Slight	Sugar maple	70	3	White spruce, Norway spruce, red pine, balsam fir.
						Northern red oak	75	4	
						American beech	70	3	
						Eastern white pine	75	10	
						Red maple	75	3	
EmF Elka	3R	Moderate	Severe	Slight	Slight	Sugar maple	70	3	White spruce, Norway spruce, red pine, balsam fir, Douglas fir.
						Northern red oak	75	4	
						American beech	70	3	
						Eastern white pine	75	10	
						Red maple	75	3	
EnA, EnB Elmridge	10A	Slight	Slight	Slight	Slight	Eastern white pine	75	10	Eastern white pine, European larch, white spruce.
						Northern red oak	70	4	
						Shagbark hickory	60	---	
FaC, FaD Farmington	2D	Slight	Slight	Severe	Moderate	Sugar maple	50	2	Eastern white pine, red pine, European larch.
						Northern red oak	55	3	
						Eastern white pine	55	6	
						Chestnut oak	70	4	
FaE Farmington	2R	Severe	Severe	Severe	Moderate	Sugar maple	50	2	Eastern white pine, red pine, European larch.
						Northern red oak	55	3	
						Eastern white pine	55	6	
						Chestnut oak	70	4	

See footnotes at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Productivity class*	Trees to plant
GfB**, GfC**:									
Galway	3A	Slight	Slight	Slight	Slight	Sugar maple	65	3	Eastern white pine, European larch, Norway spruce, red pine.
						Northern red oak	70	4	
						White ash	75	3	
						Eastern red cedar	---	---	
Farmington	2D	Slight	Slight	Severe	Moderate	Sugar maple	50	2	Eastern white pine, red pine, European larch.
						Northern red oak	55	3	
						Eastern white pine	55	6	
						Chestnut oak	70	4	
GfD**:									
Galway	3R	Moderate	Moderate	Slight	Slight	Sugar maple	65	3	Eastern white pine, European larch, Norway spruce, red pine.
						Northern red oak	70	4	
						White ash	75	3	
						Eastern red cedar	---	---	
Farmington	2D	Moderate	Moderate	Severe	Moderate	Sugar maple	50	2	Eastern white pine, red pine, European larch.
						Northern red oak	55	3	
						Eastern white pine	55	6	
						Chestnut oak	70	4	
HaB, HaC Halcott	3D	Slight	Slight	Severe	Moderate	Northern red oak	55	3	Eastern white pine, red pine, European larch.
						Sugar maple	50	2	
						White ash	---	---	
						Eastern red cedar	---	---	
						American beech	---	---	
HlC**:									
Halcott	3D	Slight	Slight	Severe	Moderate	Northern red oak	55	3	Eastern white pine, red pine, European larch.
						Sugar maple	50	2	
						White ash	---	---	
						Eastern red cedar	---	---	
						American beech	---	---	
Vly	3A	Slight	Slight	Slight	Slight	Sugar maple	70	3	Eastern white pine, red pine, Norway spruce.
						Northern red oak	70	4	
						Black cherry	70	3	
						Eastern white pine	75	10	
HlD**:									
Halcott	3D	Slight	Moderate	Severe	Moderate	Northern red oak	55	3	Eastern white pine, red pine, European larch.
						Sugar maple	50	2	
						White ash	---	---	
Vly	3R	Slight	Moderate	Slight	Slight	Sugar maple	70	3	Eastern white pine, red pine, Norway spruce.
						Northern red oak	70	4	
						Black cherry	70	3	
						Eastern white pine	75	10	
HlE**:									
Halcott	3R	Moderate	Severe	Severe	Moderate	Northern red oak	55	3	Eastern white pine, red pine, European larch.
						Sugar maple	50	2	
						White ash	---	---	

See footnotes at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
HlE**:									
Vly	3R	Moderate	Severe	Slight	Slight	Sugar maple	70	3	Eastern white pine, red pine, Norway spruce.
						Northern red oak	70	4	
						Black cherry	70	3	
						Eastern white pine	75	10	
HvB**:									
Hudson	4C	Slight	Slight	Slight	Slight	Northern red oak	80	4	Eastern white pine.
						Sugar maple	70	3	
						Eastern white pine	85	10	
						White ash	85	4	
						White oak	---	---	
Vergennes	8C	Slight	Moderate	Severe	Slight	Eastern white pine	65	8	Eastern white pine.
						Northern red oak	58	3	
						Sugar maple	60	3	
						White oak	---	---	
HvC**:									
Hudson	4R	Moderate	Slight	Slight	Slight	Northern red oak	80	4	Eastern white pine.
						Sugar maple	70	3	
						Eastern white pine	85	10	
						White ash	85	4	
						White oak	---	---	
Vergennes	8C	Slight	Moderate	Severe	Slight	Eastern white pine	65	8	Eastern white pine.
						Northern red oak	58	3	
						Sugar maple	60	3	
						White oak	---	---	
HvE**:									
Hudson	4R	Severe	Severe	Slight	Slight	Northern red oak	80	4	Eastern white pine.
						Sugar maple	70	3	
						Eastern white pine	85	10	
						White ash	85	4	
						White oak	---	---	
Vergennes	8R	Severe	Severe	Severe	Slight	Eastern white pine	65	8	Eastern white pine.
						Northern red oak	58	3	
						Sugar maple	60	3	
						White oak	---	---	
HwC3**:									
Hudson	4R	Moderate	Slight	Slight	Slight	Northern red oak	80	4	Eastern white pine.
						Sugar maple	70	3	
						Eastern white pine	85	10	
						White ash	85	4	
						White oak	---	---	
Vergennes	8C	Slight	Moderate	Severe	Slight	Eastern white pine	65	8	Eastern white pine.
						Northern red oak	58	3	
						Sugar maple	60	3	
						White oak	---	---	

See footnotes at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Productivity class*	Trees to plant
HwD3**:									
Hudson	4R	Severe	Moderate	Slight	Slight	Northern red oak	80	4	Eastern white pine.
						Sugar maple	70	3	
						Eastern white pine	85	10	
						White ash	85	4	
						White oak	---	---	
Vergennes	8R	Moderate	Severe	Severe	Slight	Eastern white pine	65	8	Eastern white pine.
						Northern red oak	58	3	
						Sugar maple	60	3	
						White oak	---	---	
KrA**, KrB**:									
Kingsbury	3W	Slight	Moderate	Slight	Moderate	Red maple	---	---	Eastern white pine, Norway spruce, white spruce.
						Eastern white pine	75	10	
						White ash	67	3	
						American elm	---	---	
Rhinebeck	3W	Slight	Moderate	Slight	Slight	Red maple	70	3	Eastern white pine, Norway spruce, white spruce.
						Northern red oak	70	4	
						Eastern white pine	75	10	
						White ash	---	---	
						American elm	---	---	
LaB, LaC: Lackawanna	4A	Slight	Slight	Slight	Slight	Northern red oak	69	4	Eastern white pine, red pine, Norway spruce, European larch, black walnut, black locust.
						Black cherry	83	4	
						Sugar maple	66	3	
						White ash	76	3	
						Eastern white pine	61	7	
						Hickory	---	---	
LaD, LaE: Lackawanna	4R	Slight	Moderate	Slight	Slight	Northern red oak	69	4	Eastern white pine, red pine, Norway spruce, European larch, black locust.
						Black cherry	83	4	
						Sugar maple	66	3	
						White ash	76	3	
						Eastern white pine	61	7	
						Hickory	---	---	
LcC**:									
Lackawanna	4A	Slight	Slight	Slight	Slight	Northern red oak	69	4	Eastern white pine, red pine, Norway spruce, European larch, black locust.
						Black cherry	83	4	
						Sugar maple	66	3	
						White ash	76	3	
						Eastern white pine	61	7	
						Hickory	---	---	
Wellsboro	4A	Slight	Slight	Slight	Slight	Northern red oak	73	4	Norway spruce, eastern white pine, European larch.
						Sugar maple	72	3	
						Eastern white pine	---	---	
						Hickory	---	---	

See footnotes at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
LcD**:									
Lackawanna	4R	Slight	Moderate	Slight	Slight	Northern red oak	69	4	Eastern white pine, red pine, Norway spruce, European larch, black locust.
						Black cherry	83	4	
						Sugar maple	66	3	
						White ash	76	3	
						Eastern white pine	61	7	
						Hickory	---	---	
Wellsboro	4R	Slight	Moderate	Slight	Slight	Northern red oak	73	4	Norway spruce, eastern white pine, European larch.
						Sugar maple	72	3	
LeB, LeC Lewbeach	3A	Slight	Slight	Slight	Slight	Sugar maple	70	3	Norway spruce, Douglas fir, eastern white pine, red pine, white spruce, balsam fir.
						Black cherry	75	3	
						American beech	---	---	
						Yellow birch	---	---	
						White ash	---	---	
LeD, LeE Lewbeach	3R	Slight	Moderate	Slight	Slight	Sugar maple	70	3	Norway spruce, Douglas fir, eastern white pine, red pine, white spruce, balsam fir.
						Black cherry	75	3	
						American beech	---	---	
						Yellow birch	---	---	
						White ash	---	---	
LfF, LgF Lewbeach	3R	Moderate	Severe	Slight	Slight	Sugar maple	70	3	Norway spruce, white spruce.
						Black cherry	75	3	
						American beech	---	---	
						Yellow birch	---	---	
						White ash	---	---	
LlC**:									
Lewbeach	3A	Slight	Slight	Slight	Slight	Sugar maple	70	3	Norway spruce, white spruce, eastern white pine, firs.
						Black cherry	75	3	
						American beech	---	---	
						Yellow birch	---	---	
						White ash	---	---	
Willowemoc	3A	Slight	Slight	Slight	Slight	Sugar maple	---	---	Norway spruce, white spruce.
						Yellow birch	---	---	
						Hemlock	---	---	
						American beech	---	---	
						Red maple	---	---	
LlD**:									
Lewbeach	3A	Slight	Moderate	Slight	Slight	Sugar maple	70	3	Norway spruce, white spruce, eastern white pine.
						Black cherry	75	3	
						American beech	---	---	
						Yellow birch	---	---	
						White ash	---	---	

See footnotes at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Productivity class*	Trees to plant
LlD**:									
Willowemoc	3R	Slight	Moderate	Slight	Slight	Sugar maple	---	---	Norway spruce, white spruce, eastern white pine.
						Yellow birch	---	---	
						Hemlock	---	---	
						American beech	---	---	
						Red maple	---	---	
LmC**:									
Lewbeach	3A	Slight	Slight	Slight	Slight	Sugar maple	70	3	Norway spruce, white spruce, eastern white pine, firs.
						Black cherry	75	3	
						American beech	---	---	
						Yellow birch	---	---	
						White ash	---	---	
Willowemoc.									
LmD**:									
Lewbeach	3A	Slight	Moderate	Slight	Slight	Sugar maple	70	3	Norway spruce, white spruce, eastern white pine.
						Black cherry	75	3	
						American beech	---	---	
						Yellow birch	---	---	
						White ash	---	---	
Willowemoc.									
LoA, LoB, LoC: Lordstown	3A	Slight	Slight	Slight	Slight	Northern red oak	62	3	Eastern white pine, European larch, red pine, Norway spruce.
						Sugar maple	75	3	
						White ash	75	3	
LoD: Lordstown	3R	Slight	Moderate	Slight	Slight	Northern red oak	62	3	Eastern white pine, European larch, red pine, Norway spruce, black locust.
						Sugar maple	75	3	
						White ash	75	3	
Lv, Ly: Lyons	2W	Slight	Severe	Severe	Severe	Red maple	50	2	Northern whitecedar.
MaB, MaC: Maplecrest	3A	Slight	Slight	Slight	Slight	Red maple	65	3	Eastern white pine, white spruce, Norway spruce, red pine, European larch.
						Northern red oak	65	4	
						Beech	60	3	
						Sugar maple	65	3	
MaD: Maplecrest	3R	Slight	Moderate	Slight	Slight	Red maple	65	3	Eastern white pine, white spruce, Norway spruce, red pine, European larch.
						Northern red oak	65	4	
						Beech	60	3	
						Sugar maple	65	3	
MaE: Maplecrest	3R	Moderate	Severe	Slight	Slight	Red maple	65	3	Eastern white pine, white spruce, Norway spruce, red pine, European larch.
						Northern red oak	65	4	
						Beech	60	3	
						Sugar maple	65	3	

See footnotes at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
MdB, MdC: Mardin	3A	Slight	Slight	Slight	Slight	Sugar maple Northern red oak Black cherry White ash	69 66 70 77	3 3 3 3	Norway spruce, eastern white pine, white spruce.
MdD: Mardin	3R	Slight	Moderate	Slight	Slight	Sugar maple Northern red oak Black cherry White ash	69 66 70 77	3 3 3 3	European larch, Norway spruce, eastern white pine, white spruce.
MeC: Mardin	3A	Slight	Slight	Slight	Slight	Sugar maple Northern red oak Black cherry White ash	69 66 70 77	3 3 3 3	European larch, Norway spruce, eastern white pine, white spruce.
Mk: Middlebury	4A	Slight	Slight	Slight	Slight	Northern red oak Sugar maple Yellow poplar	80 70 85	4 3 6	Eastern white pine, yellow poplar, Norway spruce, European larch, black walnut, black cherry, black locust.
MoA, MoB, MoC, MpC: Morris	4W	Slight	Moderate	Moderate	Moderate	Northern red oak Sugar maple Black cherry White ash	69 73 69 76	4 3 3 3	Norway spruce, white spruce.
NaC, NrC: Nassau	2D	Slight	Slight	Severe	Moderate	Sugar maple Northern red oak Eastern white pine	50 50 55	2 2 6	Eastern white pine, red pine.
NrD: Nassau	2D	Slight	Moderate	Severe	Moderate	Sugar maple Northern red oak Eastern white pine	50 50 55	2 2 6	Eastern white pine, red pine.
NrE: Nassau	2R	Moderate	Severe	Severe	Moderate	Sugar maple Northern red oak Eastern white pine	50 50 55	2 2 6	Eastern white pine, red pine.
NuB, NuC: Nunda	3A	Slight	Slight	Slight	Slight	Sugar maple Northern red oak	70 75	3 4	Norway spruce, white spruce, eastern white pine, European larch.
NuD, NuE: Nunda	3R	Moderate	Moderate	Moderate	Slight	Sugar maple Northern red oak	70 75	3 4	Norway spruce, white spruce, eastern white pine, European larch, red pine.

See footnotes at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Productivity class*	Trees to plant
NvE------------- Nunda	3R	Moderate	Moderate	Moderate	Slight	Sugar maple---------	70	3	Norway spruce, white spruce, eastern white pine, European larch, red pine.
						Northern red oak----	65	4	
OnB, OnC, OoC, OpC------------ Onteora	3W	Slight	Moderate	Moderate	Moderate	Hemlock-------------	---	---	Eastern white pine, white spruce, Norway spruce.
						Red maple-----------	75	3	
						Beech---------------	60	3	
OrB, OrC-------- Oquaga	3A	Slight	Slight	Slight	Slight	Sugar maple---------	69	3	Eastern white pine, red pine, European larch, Norway spruce.
						Northern red oak----	71	4	
						Black cherry--------	79	3	
						Eastern white pine--	75	10	
OrD------------- Oquaga	3R	Slight	Moderate	Slight	Slight	Sugar maple---------	69	3	Eastern white pine, red pine, European larch, Norway spruce.
						Northern red oak----	71	4	
						Black cherry--------	79	3	
						Eastern white pine--	75	10	
OsC**:									
Oquaga---------	3A	Slight	Slight	Slight	Slight	Sugar maple---------	69	3	Eastern white pine, red pine, European larch, Norway spruce.
						Northern red oak----	71	4	
						Black cherry--------	79	3	
						Eastern white pine--	75	10	
Arnot----------	3D	Slight	Slight	Severe	Moderate	Northern red oak----	58	3	Eastern white pine, red pine.
						Sugar maple---------	60	3	
						Eastern white pine--	55	6	
						White ash-----------	55	2	
OsD**, OsF**:									
Oquaga---------	3R	Slight	Moderate	Slight	Slight	Sugar maple---------	69	3	Eastern white pine, red pine, Norway spruce.
						Northern red oak----	71	4	
						Black cherry--------	79	3	
						Eastern white pine--	75	10	
Arnot----------	3D	Slight	Moderate	Severe	Moderate	Northern red oak----	58	3	Eastern white pine, red pine.
						Sugar maple---------	60	3	
						Eastern white pine--	55	6	
						White ash-----------	55	2	
RhA, RhB, RhC--- Riverhead	3A	Slight	Slight	Slight	Slight	Sugar maple---------	63	3	Eastern white pine, European larch, red pine.
						Northern red oak----	70	4	
						Black cherry--------	70	3	
						Eastern white pine--	75	10	
RhD------------- Riverhead	3R	Slight	Moderate	Slight	Slight	Sugar maple---------	63	3	Eastern white pine, European larch, red pine.
						Northern red oak----	70	4	
						Black cherry--------	70	3	
						Eastern white pine--	75	10	

See footnotes at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordi-nation symbol	Management concerns: Erosion hazard	Management concerns: Equip-ment limita-tion	Management concerns: Seedling mortal-ity	Management concerns: Wind-throw hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Produc-tivity class*	Trees to plant
Sh------------ Shaker	7W	Slight	Severe	Severe	Severe	Eastern white pine--	57	7	White spruce, Norway spruce.
						Red maple-----------	55	2	
						Sugar maple---------	55	2	
Su------------ Suny	4W	Slight	Severe	Severe	Severe	Hemlock-------------	---	---	
						Red maple-----------	---	---	
Ta------------ Tioga	4A	Slight	Slight	Slight	Slight	Northern red oak----	75	4	Eastern white pine, yellow poplar, black walnut, European larch, red pine.
						Yellow poplar-------	85	6	
						Sugar maple---------	86	4	
To, Tr---------- Tor	2W	Slight	Severe	Severe	Severe	Red maple-----------	55	2	White spruce, Norway spruce.
						American elm--------	---	---	
						Eastern hemlock-----	45	---	
Ts------------ Tuller	2W	Slight	Severe	Severe	Severe	Red maple-----------	55	2	White spruce, Norway spruce.
						American beech------	---	---	
						American elm--------	---	---	
						Eastern hemlock-----	45	---	
Tt------------ Tuller	2W	Slight	Severe	Severe	Severe	Red maple-----------	55	2	White spruce, Norway spruce, black locust.
						American elm--------	---	---	
						American beech------	---	---	
						Eastern hemlock-----	45	---	
TuA, TuB, TuC--- Tunkhannock	4A	Slight	Slight	Slight	Slight	Northern red oak----	70	4	Eastern white pine, red pine, Japanese larch, Norway spruce, black locust.
						Sugar maple---------	65	3	
TuD----------- Tunkhannock	4R	Slight	Moderate	Slight	Slight	Northern red oak----	70	4	Eastern white pine, red pine, Japanese larch, Norway spruce.
						Sugar maple---------	65	3	
TvB----------- Tunkhannock	4A	Slight	Slight	Slight	Slight	Northern red oak----	70	4	Eastern white pine, red pine, European larch, Norway spruce.
						Sugar maple---------	65	3	
TwE**:									
Tunkhannock----	4R	Moderate	Severe	Slight	Slight	Northern red oak----	70	4	Eastern white pine, red pine, Japanese larch, Norway spruce.
						Sugar maple---------	65	3	

See footnotes at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Productivity class*	Trees to plant
TwE**:									
Chenango-------	4R	Moderate	Severe	Slight	Slight	Sugar maple--------- Northern red oak---- Hickory-------------	86 80 ---	4 4 ---	Eastern white pine, red pine, European larch, black locust, northern red oak, yellow poplar.
VaB, VaC-------- Valois	3A	Slight	Slight	Slight	Slight	Sugar maple--------- Northern red oak---- White ash----------- American basswood---	69 70 93 70	3 4 3 3	Eastern white pine, white spruce, Norway spruce, red pine, European larch, black locust.
VaD------------- Valois	3R	Slight	Moderate	Slight	Slight	Sugar maple--------- Northern red oak---- White ash----------- American basswood---	69 70 93 70	3 4 4 3	Eastern white pine, white spruce, Norway spruce, red pine, European larch, black locust.
VaF------------- Valois	3R	Moderate	Severe	Slight	Slight	Sugar maple--------- Northern red oak---- White ash----------- American basswood---	61 70 70 70	3 4 3 3	Eastern white pine, white spruce, Norway spruce, red pine, European larch, black locust.
VbE------------- Valois	3R	Slight	Moderate	Slight	Slight	Sugar maple--------- Northern red oak---- White ash----------- American basswood---	61 70 70 70	3 4 3 3	Eastern white pine, white spruce, Norway spruce, red pine, European larch, black locust.
VbF------------- Valois	3R	Moderate	Severe	Slight	Slight	Sugar maple--------- Northern red oak---- White ash----------- American basswood---	61 70 70 70	3 4 3 3	Eastern white pine, white spruce, Norway spruce, red pine, European larch, black locust.
VdB**:									
Valois---------	3A	Slight	Slight	Slight	Slight	Sugar maple--------- Northern red oak---- White ash----------- American basswood---	61 70 70 70	3 4 3 3	Eastern white pine, white spruce, Norway spruce, red pine, European larch, black locust.

See footnotes at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Productivity class*	Trees to plant
VdB**:									
Nassau	2D	Slight	Slight	Severe	Moderate	Sugar maple Northern red oak Eastern white pine	50 50 55	2 2 6	Eastern white pine, red pine, European larch.
VdD**:									
Valois	3R	Slight	Moderate	Slight	Slight	Sugar maple Northern red oak White ash American basswood	69 70 93 70	3 4 4 3	Eastern white pine, white spruce, Norway spruce, red pine, European larch, black locust.
Nassau	2D	Slight	Moderate	Severe	Moderate	Sugar maple Northern red oak Eastern white pine	50 50 55	2 2 6	Eastern white pine, red pine, European larch.
VeB, VeC Vly	3A	Slight	Slight	Slight	Slight	Sugar maple Northern red oak Black cherry Eastern white pine	70 70 70 75	3 4 3 10	Eastern white pine, red pine, Norway spruce, European larch.
VeD Vly	3R	Slight	Moderate	Slight	Slight	Sugar maple Northern red oak Black cherry Eastern white pine	70 70 70 75	3 4 3 10	Eastern white pine, red pine, Norway spruce, European larch.
VhC**:									
Vly	3A	Slight	Slight	Slight	Slight	Sugar maple Northern red oak Black cherry Eastern white pine	70 70 70 75	3 4 3 10	Eastern white pine, red pine, Norway spruce, European larch.
Halcott	3D	Slight	Slight	Severe	Moderate	Northern red oak Sugar maple Eastern white pine White ash	55 50 55 ---	3 2 6 ---	Eastern white pine, red pine.
VhD**:									
Vly	3R	Slight	Moderate	Slight	Slight	Sugar maple Northern red oak Black cherry Eastern white pine	70 70 70 75	3 4 3 10	Eastern white pine, red pine, Norway spruce, European larch.
Halcott	3D	Slight	Moderate	Severe	Moderate	Northern red oak Sugar maple Eastern white pine White ash	55 50 55 ---	3 2 6 ---	Eastern white pine, red pine.

See footnotes at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Productivity class*	Trees to plant
VhF**:									
Vly	3R	Moderate	Severe	Slight	Slight	Sugar maple	70	3	Eastern white pine, red pine, Norway spruce, European larch.
						Northern red oak	70	4	
						Black cherry	70	3	
						Eastern white pine	75	10	
Halcott	3R	Moderate	Severe	Severe	Moderate	Northern red oak	55	3	Eastern white pine, red pine.
						Sugar maple	50	2	
						Eastern white pine	55	6	
						White ash	---	---	
VoA, VoB, VoC, VpC Volusia	3W	Slight	Moderate	Moderate	Moderate	Northern red oak	67	3	Eastern white pine, Norway spruce, white spruce.
						Sugar maple	72	3	
						White ash	75	3	
Wa Wayland	3W	Slight	Severe	Severe	Severe	Red maple	65	3	
WeB, WeC Wellsboro	4A	Slight	Slight	Slight	Slight	Northern red oak	73	4	Norway spruce, eastern white pine, black cherry, white spruce.
						Sugar maple	72	3	
WeD Wellsboro	4R	Slight	Moderate	Slight	Slight	Northern red oak	73	4	Norway spruce, white spruce, eastern white pine, black cherry.
						Sugar maple	72	3	
WmB, WmC Willowemoc	3A	Slight	Slight	Slight	Slight	Sugar maple	70	3	Black cherry, Norway spruce, white spruce.
						Yellow birch	---	---	
						Hemlock	---	---	
						American beech	---	---	
						Red maple	---	---	
WmD Willowemoc	3R	Slight	Moderate	Slight	Slight	Sugar maple	70	3	Black cherry, Norway spruce, white spruce.
						Yellow birch	---	---	
						Hemlock	---	---	
						American beech	---	---	
						Red maple	---	---	

* Productivity class is the yield in cubic meters per hectare per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Ad-------------------- Alden	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
Am-------------------- Alden	Severe: ponding.	Severe: ponding.	Severe: large stones, ponding.	Severe: ponding.	Severe: ponding.
ArA, ArB-------------- Arnot	Severe: depth to rock.	Severe: depth to rock.	Severe: small stones.	Slight----------	Severe: thin layer.
ArC------------------- Arnot	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, small stones.	Slight----------	Severe: thin layer.
AsC*:					
Arnot----------------	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, small stones.	Slight----------	Severe: thin layer.
Lordstown------------	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight----------	Moderate: large stones, slope.
AsD*:					
Arnot----------------	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones.	Moderate: slope.	Severe: slope, thin layer.
Lordstown------------	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
AsE*:					
Arnot----------------	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones.	Severe: slope.	Severe: slope, thin layer.
Lordstown------------	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
AuC*:					
Arnot----------------	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, small stones.	Slight----------	Severe: thin layer.
Lordstown------------	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight----------	Moderate: large stones, slope.
AvD*, AvF*:					
Arnot----------------	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones.	Severe: slope.	Severe: slope, thin layer.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
AvD*, AvF*:					
Lordstown	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
AwC*:					
Arnot	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, small stones.	Slight	Severe: thin layer.
Oquaga	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Severe: small stones.	Severe: small stones.
AwD*:					
Arnot	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones.	Moderate: slope.	Severe: slope, thin layer.
Oquaga	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones.	Severe: small stones, slope.
AwE*:					
Arnot	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones.	Severe: slope.	Severe: slope, thin layer.
Oquaga	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones, slope.
Ba Barbour	Severe: flooding.	Slight	Moderate: small stones.	Slight	Moderate: flooding, droughty.
Bs Basher	Severe: flooding.	Moderate: wetness.	Moderate: wetness, flooding.	Moderate: wetness.	Moderate: wetness, flooding.
BuA, BuB Burdett	Severe: wetness.	Severe: wetness.	Severe: small stones, wetness.	Severe: wetness.	Severe: wetness.
BuC Burdett	Severe: wetness.	Severe: wetness.	Severe: slope, small stones, wetness.	Severe: wetness.	Severe: wetness.
BvC Burdett	Severe: wetness.	Severe: wetness.	Severe: large stones, slope, small stones.	Severe: wetness.	Severe: wetness.
BwB Busti	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Ca Canandaigua	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Cc-------------------- Carlisle	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
ChB------------------- Chautauqua	Moderate: wetness.	Moderate: wetness.	Moderate: slope, small stones.	Moderate: wetness.	Moderate: small stones.
ChC------------------- Chautauqua	Moderate: slope, wetness.	Moderate: slope, wetness.	Severe: slope.	Moderate: wetness.	Moderate: small stones, slope.
CnA, CnB-------------- Chenango	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight----------	Moderate: small stones, droughty.
CnC------------------- Chenango	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight----------	Moderate: small stones, slope, droughty.
Co*:					
Covington------------	Severe: wetness, percs slowly, too clayey.	Severe: wetness, too clayey, percs slowly.	Severe: too clayey, wetness.	Severe: wetness, too clayey.	Severe: wetness, too clayey.
Madalin--------------	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
Du*. Dumps					
ElB------------------- Elka	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight----------	Moderate: small stones.
ElC------------------- Elka	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight----------	Moderate: small stones, slope.
ElD------------------- Elka	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
EmC------------------- Elka	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: large stones, slope, small stones.	Slight----------	Moderate: small stones, large stones, slope.
EmD, EmF-------------- Elka	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: slope.
EnA------------------- Elmridge	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
EnB: Elmridge	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
FaC: Farmington	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, small stones, depth to rock.	Slight	Severe: thin layer.
FaD, FaE: Farmington	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Moderate: slope.	Severe: slope, thin layer.
Fu*: Fluvaquents.					
Udifluvents.					
GfB*: Galway	Moderate: small stones, wetness.	Moderate: small stones, wetness.	Severe: small stones.	Moderate: wetness.	Moderate: small stones, wetness.
Farmington	Severe: depth to rock.	Severe: depth to rock.	Severe: small stones, depth to rock.	Slight	Severe: thin layer.
GfC*: Galway	Moderate: slope, small stones, wetness.	Moderate: slope, small stones, wetness.	Severe: slope, small stones.	Moderate: wetness.	Moderate: small stones, wetness, slope.
Farmington	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, small stones, depth to rock.	Slight	Severe: thin layer.
GfD*: Galway	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, wetness.	Severe: slope.
Farmington	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Moderate: slope.	Severe: slope, thin layer.
HaB: Halcott	Severe: depth to rock.	Severe: depth to rock.	Severe: small stones, depth to rock.	Slight	Severe: depth to rock.
HaC: Halcott	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, small stones, depth to rock.	Slight	Severe: depth to rock.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
HlC*:					
Halcott	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, small stones, depth to rock.	Slight	Severe: depth to rock.
Vly	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Slight	Severe: small stones, droughty.
HlD*:					
Halcott	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Moderate: slope.	Severe: slope, depth to rock.
Vly	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Moderate: slope.	Severe: small stones, droughty, slope.
HlE*:					
Halcott	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.	Severe: slope, depth to rock.
Vly	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope.	Severe: small stones, droughty, slope.
HvB*:					
Hudson	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
Vergennes	Severe: wetness, percs slowly.	Severe: percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
HvC*:					
Hudson	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: wetness, slope.
Vergennes	Severe: wetness, percs slowly.	Severe: percs slowly.	Severe: slope, wetness.	Severe: erodes easily.	Moderate: wetness, slope.
HvE*:					
Hudson	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
Vergennes	Severe: slope, wetness, percs slowly.	Severe: slope, percs slowly.	Severe: slope, wetness.	Severe: slope, erodes easily.	Severe: slope.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
HwC3*:					
Hudson	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: wetness, slope.
Vergennes	Severe: wetness, percs slowly.	Severe: percs slowly.	Severe: slope, wetness.	Severe: erodes easily.	Moderate: wetness, slope.
HwD3*:					
Hudson	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Vergennes	Severe: slope, wetness, percs slowly.	Severe: slope, percs slowly.	Severe: slope, wetness.	Severe: erodes easily.	Severe: slope.
KrA*, KrB*:					
Kingsbury	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
Rhinebeck	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
LaB Lackawanna	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight	Moderate: small stones.
LaC Lackawanna	Moderate: small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Moderate: small stones, slope.
LaD Lackawanna	Moderate: slope, small stones.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
LaE Lackawanna	Moderate: slope, small stones.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
LcC*:					
Lackawanna	Moderate: small stones, slope.	Moderate: slope, small stones.	Severe: large stones, slope, small stones.	Slight	Moderate: small stones, slope, large stones.
Wellsboro	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: slope.	Moderate: wetness.	Moderate: large stones, slope.
LcD*:					
Lackawanna	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: slope.
Wellsboro	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
LeB: Lewbeach	Severe: percs slowly.	Severe: percs slowly.	Severe: small stones, percs slowly.	Slight	Moderate: small stones, droughty.
LeC: Lewbeach	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, small stones, percs slowly.	Slight	Moderate: small stones, droughty.
LeD: Lewbeach	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: slope, small stones, percs slowly.	Moderate: slope.	Severe: slope.
LeE: Lewbeach	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: slope, small stones, percs slowly.	Severe: slope.	Severe: slope.
LfF: Lewbeach	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: small stones, slope.
LgF: Lewbeach	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: small stones, slope.
LlC*:					
Lewbeach	Severe: small stones.	Severe: small stones.	Severe: large stones, slope, small stones.	Slight	Severe: small stones.
Willowemoc	Severe: small stones.	Severe: small stones.	Severe: large stones, slope, small stones.	Moderate: wetness.	Severe: small stones, droughty.
LlD*:					
Lewbeach	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: small stones, slope.
Willowemoc	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: small stones, droughty, slope.
LmC*:					
Lewbeach	Severe: percs slowly.	Severe: percs slowly.	Severe: large stones, slope, small stones.	Slight	Severe: small stones.
Willowemoc	Severe: percs slowly.	Severe: percs slowly.	Severe: large stones, slope, small stones.	Moderate: wetness.	Severe: small stones, droughty.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
LmD*:					
Lewbeach	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: small stones, slope.
Willowemoc	Severe: percs slowly, slope.	Severe: percs slowly, slope.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: small stones, droughty, slope.
LoA, LoB Lordstown	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight	Moderate: large stones.
LoC Lordstown	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Moderate: large stones, slope.
LoD Lordstown	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
Lv Lyons	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Ly Lyons	Severe: wetness, percs slowly.	Severe: wetness.	Severe: large stones, wetness.	Severe: wetness.	Severe: wetness.
MaB Maplecrest	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight	Moderate: small stones.
MaC Maplecrest	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Moderate: small stones, slope.
MaD Maplecrest	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
MaE Maplecrest	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
MdB Mardin	Severe: percs slowly.	Severe: percs slowly.	Severe: small stones, percs slowly.	Slight	Moderate: small stones.
MdC Mardin	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, small stones, percs slowly.	Slight	Moderate: small stones, slope.
MdD Mardin	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: slope, small stones, percs slowly.	Moderate: slope.	Severe: slope.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
MeC-------------------- Mardin	Severe: percs slowly.	Severe: percs slowly.	Severe: large stones, slope, small stones.	Moderate: wetness.	Moderate: large stones, wetness, slope.
Mf*. Medisaprists					
Mh*: Medisaprists.					
Hydraquents.					
Mk--------------------- Middlebury	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
MoA, MoB-------------- Morris	Severe: wetness.	Severe: wetness.	Severe: small stones, wetness.	Severe: wetness.	Severe: wetness.
MoC-------------------- Morris	Severe: wetness.	Severe: wetness.	Severe: slope, small stones, wetness.	Severe: wetness.	Severe: wetness.
MpC-------------------- Morris	Severe: wetness.	Severe: wetness.	Severe: wetness, large stones, slope.	Severe: wetness.	Severe: wetness.
NaC, NrC-------------- Nassau	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, small stones.	Slight-----------	Severe: thin layer.
NrD-------------------- Nassau	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones.	Moderate: slope.	Severe: slope, thin layer.
NrE-------------------- Nassau	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones.	Severe: slope.	Severe: slope, thin layer.
NuB-------------------- Nunda	Moderate: wetness.	Moderate: wetness.	Moderate: slope, small stones.	Moderate: wetness.	Moderate: wetness.
NuC-------------------- Nunda	Moderate: slope, wetness.	Moderate: slope, wetness.	Severe: slope.	Severe: erodes easily.	Moderate: wetness, slope.
NuD-------------------- Nunda	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
NuE-------------------- Nunda	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
NvC: Nunda	Moderate: slope, large stones, wetness.	Moderate: slope, wetness, large stones.	Severe: large stones, slope, small stones.	Severe: small stones.	Severe: small stones.
NvE: Nunda	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope, small stones.	Severe: small stones, slope.
Oc*. Ochrepts					
OnB: Onteora	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
OnC: Onteora	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness.	Severe: wetness, droughty.
OoC, OpC: Onteora	Severe: small stones, wetness.	Severe: wetness, small stones.	Severe: large stones, slope, small stones.	Severe: wetness.	Severe: small stones, wetness, droughty.
OrB: Oquaga	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.
OrC: Oquaga	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Severe: small stones.	Severe: small stones.
OrD: Oquaga	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones.	Severe: small stones, slope.
OsC*:					
Oquaga	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Severe: small stones.	Severe: small stones.
Arnot	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, small stones.	Slight	Severe: thin layer.
OsD*, OsF*:					
Oquaga	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones, slope.
Arnot	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones.	Severe: slope.	Severe: slope, thin layer.
Pg*, Pr*. Pits					
RhA: Riverhead	Slight	Slight	Slight	Slight	Slight.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
RhB Riverhead	Slight	Slight	Moderate: slope.	Slight	Slight.
RhC Riverhead	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
RhD Riverhead	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Sh Shaker	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
Su Suny	Severe: wetness.	Severe: wetness.	Severe: large stones, small stones, wetness.	Severe: wetness.	Severe: wetness. droughty.
Ta Tioga	Severe: flooding.	Slight	Moderate: flooding.	Slight	Moderate: flooding.
To, Tr Tor	Severe: wetness, depth to rock.	Severe: wetness, depth to rock.	Severe: large stones, small stones, wetness.	Severe: wetness.	Severe: wetness, depth to rock.
Ts Tuller	Severe: wetness, depth to rock.	Severe: wetness, depth to rock.	Severe: small stones, wetness.	Severe: wetness.	Severe: wetness, thin layer.
Tt Tuller	Severe: wetness, depth to rock.	Severe: wetness, depth to rock.	Severe: large stones, small stones.	Severe: wetness.	Severe: wetness, thin layer.
TuA, TuB Tunkhannock	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight	Severe: small stones.
TuC Tunkhannock	Moderate: small stones, slope.	Moderate: small stones, slope.	Severe: slope, small stones.	Slight	Severe: small stones.
TuD Tunkhannock	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Moderate: slope.	Severe: small stones, slope.
TvB Tunkhannock	Severe: flooding.	Moderate: small stones.	Severe: small stones.	Slight	Moderate: small stones, large stones, droughty.
TwE*:					
Tunkhannock	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope.	Severe: small stones, slope.
Chenango	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Ud*. Udipsamments					
Ur*. Udorthents					
VaB Valois	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight	Moderate: small stones, droughty.
VaC Valois	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Moderate: small stones, droughty.
VaD Valois	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
VaF Valois	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
VbE, VbF Valois	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: slope.
VdB*:					
Valois	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight	Moderate: small stones, droughty.
Nassau	Severe: depth to rock.	Severe: depth to rock.	Severe: small stones, depth to rock.	Slight	Severe: thin layer.
VdD*:					
Valois	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
Nassau	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones.	Moderate: slope.	Severe: slope, thin layer.
VeB Vly	Severe: small stones.	Severe: small stones.	Severe: small stones.	Slight	Severe: small stones, droughty.
VeC Vly	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Slight	Severe: small stones, droughty.
VeD Vly	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Moderate: slope.	Severe: small stones, droughty, slope.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
VhC*:					
Vly	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Slight	Severe: small stones, droughty.
Halcott	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, small stones, depth to rock.	Slight	Severe: depth to rock.
VhD*:					
Vly	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Moderate: slope.	Severe: small stones, droughty, slope.
Halcott	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Moderate: slope.	Severe: slope, depth to rock.
VhF*:					
Vly	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope.	Severe: small stones, droughty, slope.
Halcott	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.	Severe: slope, depth to rock.
VoA, VoB Volusia	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: small stones, wetness.	Severe: wetness.	Severe: wetness, droughty.
VoC Volusia	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: slope, small stones, wetness.	Severe: wetness.	Severe: wetness, droughty.
VpC Volusia	Severe: wetness.	Severe: wetness.	Severe: large stones, slope, small stones.	Severe: wetness.	Severe: wetness, droughty.
Wa Wayland	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
WeB Wellsboro	Moderate: percs slowly, wetness.	Moderate: wetness, percs slowly.	Severe: small stones.	Moderate: wetness.	Moderate: large stones.
WeC Wellsboro	Moderate: slope, percs slowly, wetness.	Moderate: slope, wetness, percs slowly.	Severe: slope, small stones.	Moderate: wetness.	Moderate: slope, large stones.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
WeD: Wellsboro	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, wetness.	Severe: slope.
WmB: Willowemoc	Severe: percs slowly.	Severe: percs slowly.	Severe: small stones, percs slowly.	Moderate: wetness.	Moderate: large stones.
WmC: Willowemoc	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, small stones, percs slowly.	Moderate: wetness.	Moderate: slope, large stones.
WmD: Willowemoc	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: slope, small stones, percs slowly.	Moderate: wetness, slope.	Severe: slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
Ad, Am: Alden	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
ArA, ArB, ArC: Arnot	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
AsC*:										
Arnot	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Lordstown	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
AsD*:										
Arnot	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Lordstown	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
AsE*:										
Arnot	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Lordstown	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
AuC*:										
Arnot	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Lordstown	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
AvD*:										
Arnot	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Lordstown	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
AvF*:										
Arnot	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Lordstown	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
AwC*:										
Arnot	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Oquaga	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hardwood trees	Conif- erous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
AwD*:										
Arnot-------------	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Oquaga------------	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
AwE*:										
Arnot-------------	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Oquaga------------	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Ba---------------- Barbour	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Bs---------------- Basher	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
BuA--------------- Burdett	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
BuB--------------- Burdett	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
BuC--------------- Burdett	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
BvC--------------- Burdett	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
BwB--------------- Busti	Fair	Fair	Good	Good	Good	Poor	Very poor.	Fair	Fair	Poor.
Ca---------------- Canandaigua	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Very poor.	Poor	Good.
Cc---------------- Carlisle	Fair	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
ChB--------------- Chautauqua	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Very poor.
ChC--------------- Chautauqua	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CnA, CnB, CnC------ Chenango	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Co*:										
Covington---------	Poor	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair.
Madalin-----------	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Du*. Dumps										

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
ElB-----------------Elka	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
ElC-----------------Elka	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
ElD-----------------Elka	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
EmC, EmD, EmF------Elka	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
EnA-----------------Elmridge	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
EnB-----------------Elmridge	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
FaC, FaD, FaE------Farmington	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Fu*: Fluvaquents.										
Udifluvents.										
GfB*: Galway-------------	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Farmington---------	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
GfC*: Galway-------------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Farmington---------	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
GfD*: Galway-------------	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Farmington---------	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
HaB, HaC-----------Halcott	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
HlC*: Halcott------------	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Vly-----------------	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
HlD*:										
Halcott	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Vly	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
HlE*:										
Halcott	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Vly	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
HvB*:										
Hudson	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Vergennes	Fair	Fair	Poor	Good	Good	Poor	Very poor.	Fair	Fair	Very poor.
HvC*:										
Hudson	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Vergennes	Fair	Fair	Poor	Good	Good	Very poor.	Very poor.	Fair	Fair	Very poor.
HvE*:										
Hudson	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Vergennes	Very poor.	Poor	Poor	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
HwC3*:										
Hudson	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Vergennes	Fair	Fair	Poor	Good	Good	Very poor.	Very poor.	Fair	Fair	Very poor.
HwD3*:										
Hudson	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Vergennes	Poor	Fair	Poor	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
KrA*:										
Kingsbury	Fair	Fair	Fair	Good	Good	Poor	Fair	Fair	Good	Poor.
Rhinebeck	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
KrB*:										
Kingsbury	Fair	Fair	Fair	Good	Good	Poor	Very poor.	Fair	Good	Poor.

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
KrB*:										
Rhinebeck	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
LaB Lackawanna	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
LaC Lackawanna	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
LaD Lackawanna	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
LaE Lackawanna	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
LcC*, LcD*:										
Lackawanna	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Wellsboro	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
LeB Lewbeach	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
LeC Lewbeach	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
LeD Lewbeach	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
LeE Lewbeach	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
LfF, LgF Lewbeach	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
LlC*:										
Lewbeach	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Willowemoc	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
LlD*:										
Lewbeach	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Willowemoc	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
LmC*:										
Lewbeach	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Willowemoc	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
LmD*:										
Lewbeach	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Willowemoc	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
LoA, LoB Lordstown	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
LoC Lordstown	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
LoD Lordstown	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Lv, Ly Lyons	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
MaB Maplecrest	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
MaC Maplecrest	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
MaD Maplecrest	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
MaE Maplecrest	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
MdB Mardin	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
MdC Mardin	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
MdD Mardin	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
MeC Mardin	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Mf*. Medisaprists										
Mh*:										
Medisaprists.										
Hydraquents.										
Mk Middlebury	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
MoA Morris	Fair	Good	Good	Fair	Fair	Fair	Fair	Good	Fair	Fair.
MoB Morris	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba-ceous plants	Hardwood trees	Conif-erous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
MoC: Morris	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
MpC: Morris	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
NaC, NrC, NrD: Nassau	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
NrE: Nassau	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
NuB: Nunda	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
NuC: Nunda	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
NuD, NuE: Nunda	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Fair	Very poor.
NvC, NvE: Nunda	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Oc*. Ochrepts										
OnB: Onteora	Fair	Fair	Good	Fair	Fair	Poor	Very poor.	Fair	Fair	Poor.
OnC: Onteora	Fair	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
OoC, OpC: Onteora	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
OrB: Oquaga	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
OrC: Oquaga	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
OrD: Oquaga	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
OsC*:										
Oquaga	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
Arnot	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
OsD*, OsF*:										
Oquaga	Very poor.	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Arnot	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
Pg*, Pr*. Pits										
RhA----------------- Riverhead	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
RhB, RhC----------- Riverhead	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
RhD----------------- Riverhead	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Sh------------------ Shaker	Poor	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
Su------------------ Suny	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Ta------------------ Tioga	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
To, Tr------------- Tor	Very poor.	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Poor	Very poor.	Fair.
Ts, Tt------------- Tuller	Very poor.	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Poor	Very poor.	Fair.
TuA, TuB, TuC------ Tunkhannock	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
TuD----------------- Tunkhannock	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
TvB----------------- Tunkhannock	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
TwE*:										
Tunkhannock--------	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Chenango-----------	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Ud*. Udipsamments										
Ur*. Udorthents										
VaB----------------- Valois	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
VaC----------------- Valois	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
VaD----------------- Valois	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
VaF, VbE, VbF------ Valois	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
VdB*:										
Valois------------	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Nassau------------	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
VdD*:										
Valois------------	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Nassau------------	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
VeB---------------- Vly	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
VeC---------------- Vly	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
VeD---------------- Vly	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
VhC*:										
Vly---------------	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
Halcott-----------	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
VhD*:										
Vly---------------	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Halcott-----------	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
VhF*:										
Vly---------------	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Halcott-----------	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
VoA---------------- Volusia	Fair	Fair	Fair	Poor	Poor	Fair	Fair	Fair	Poor	Fair.
VoB---------------- Volusia	Fair	Fair	Fair	Poor	Poor	Poor	Very poor.	Fair	Poor	Very poor.
VoC---------------- Volusia	Fair	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
VpC---------------- Volusia	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
Wa------------------ Wayland	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
WeB----------------- Wellsboro	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
WeC----------------- Wellsboro	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
WeD----------------- Wellsboro	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
WmB----------------- Willowemoc	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
WmC----------------- Willowemoc	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
WmD----------------- Willowemoc	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Ad------------------ Alden	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: ponding.
Am------------------ Alden	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
ArA, ArB----------- Arnot	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: thin layer.
ArC---------------- Arnot	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: thin layer.
AsC*:						
Arnot------------	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: thin layer.
Lordstown---------	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: slope, depth to rock, frost action.	Moderate: large stones, slope.
AsD*, AsE*:						
Arnot------------	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, thin layer.
Lordstown---------	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: slope.
AuC*:						
Arnot------------	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: thin layer.
Lordstown---------	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: slope, depth to rock, frost action.	Moderate: large stones, slope.
AvD*, AvE*:						
Arnot------------	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, thin layer.
Lordstown---------	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
AwC*:						
Arnot	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: thin layer.
Oquaga	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: slope, depth to rock, frost action.	Severe: small stones.
AwD*, AwE*:						
Arnot	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, thin layer.
Oquaga	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
Ba Barbour	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, droughty.
Bs Basher	Severe: wetness, cutbanks cave.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding, frost action.	Moderate: wetness, flooding.
BuA, BuB Burdett	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
BuC, BvC Burdett	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, slope.	Severe: wetness, frost action.	Severe: wetness.
BwB Busti	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
Ca Canandaigua	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
Cc Carlisle	Severe: excess humus, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, frost action.	Severe: ponding, excess humus.
ChB Chautauqua	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: wetness, frost action.	Moderate: small stones.
ChC Chautauqua	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Moderate: frost action, wetness, slope.	Moderate: small stones, slope.
CnA Chenango	Severe: cutbanks cave.	Slight	Slight	Slight	Moderate: frost action.	Moderate: small stones, droughty.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
CnB--------------- Chenango	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Moderate: frost action.	Moderate: small stones, droughty.
CnC--------------- Chenango	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: small stones, slope, droughty.
Co*:						
Covington--------	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, low strength, shrink-swell.	Severe: wetness, too clayey.
Madalin----------	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, low strength, frost action.	Severe: wetness.
Du*. Dumps						
ElB--------------- Elka	Slight---------	Slight---------	Slight---------	Moderate: slope.	Moderate: frost action.	Moderate: small stones.
ElC--------------- Elka	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: small stones, slope.
ElD--------------- Elka	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
EmC--------------- Elka	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: small stones, large stones, slope.
EmD, EmF---------- Elka	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
EnA--------------- Elmridge	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Severe: low strength, frost action.	Moderate: wetness.
EnB--------------- Elmridge	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Severe: low strength, frost action.	Moderate: wetness.
FaC--------------- Farmington	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: thin layer.
FaD, FaE---------- Farmington	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, thin layer.
Fu*: Fluvaquents.						
Udifluvents.						

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
GfB*:						
Galway-----------	Severe: depth to rock, wetness.	Moderate: depth to rock, wetness.	Severe: depth to rock, wetness.	Moderate: slope, depth to rock, wetness.	Moderate: depth to rock, wetness.	Moderate: small stones, wetness.
Farmington-------	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: thin layer.
GfC*:						
Galway-----------	Severe: depth to rock, wetness.	Moderate: slope, depth to rock, wetness.	Severe: depth to rock, wetness.	Severe: slope.	Moderate: depth to rock, slope, wetness.	Moderate: small stones, wetness, slope.
Farmington-------	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: thin layer.
GfD*:						
Galway-----------	Severe: depth to rock, slope, wetness.	Severe: slope.	Severe: depth to rock, slope, wetness.	Severe: slope.	Severe: slope.	Severe: slope.
Farmington-------	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, thin layer.
HaB--------------- Halcott	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.
HaC--------------- Halcott	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: depth to rock.
HlC*:						
Halcott----------	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: depth to rock.
Vly--------------	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope, frost action.	Severe: small stones, droughty.
HlD*, HlE*:						
Halcott----------	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.
Vly--------------	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: small stones, droughty, slope.
HvB*:						
Hudson-----------	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: frost action, low strength.	Moderate: wetness.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
HvB*:						
Vergennes--------	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength.	Moderate: wetness.
HvC*:						
Hudson-----------	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: wetness.	Severe: slope.	Severe: frost action, low strength.	Moderate: wetness, slope.
Vergennes--------	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, slope.	Severe: low strength.	Moderate: wetness, slope.
HvE*:						
Hudson-----------	Severe: slope, wetness.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Severe: slope, frost action, low strength.	Severe: slope.
Vergennes--------	Severe: wetness, slope.	Severe: wetness, slope.	Severe: wetness, slope.	Severe: wetness, slope.	Severe: low strength, slope.	Severe: slope.
HwC3*:						
Hudson-----------	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: wetness.	Severe: slope.	Severe: frost action, low strength.	Moderate: wetness, slope.
Vergennes--------	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, slope.	Severe: low strength.	Moderate: wetness, slope.
HwD3*:						
Hudson-----------	Severe: slope, wetness.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Severe: slope, frost action, low strength.	Severe: slope.
Vergennes--------	Severe: wetness, slope.	Severe: wetness, slope.	Severe: wetness, slope.	Severe: wetness, slope.	Severe: low strength, slope.	Severe: slope.
KrA*, KrB*:						
Kingsbury--------	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, wetness, frost action.	Severe: wetness.
Rhinebeck--------	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action, wetness.	Severe: wetness.
LaB--------------- Lackawanna	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: wetness, frost action.	Moderate: small stones.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
LaC---------------- Lackawanna	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Moderate: wetness, slope, frost action.	Severe: small stones, slope.
LaD, LaE---------- Lackawanna	Severe: wetness, slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Severe: slope.	Severe: slope.
LcC*:						
Lackawanna-------	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Moderate: wetness, slope, frost action.	Moderate: small stones, slope, large stones.
Wellsboro--------	Severe: wetness.	Moderate: slope, wetness.	Severe: wetness.	Severe: slope.	Severe: frost action.	Moderate: large stones, slope.
LcD*:						
Lackawanna-------	Severe: wetness, slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Severe: slope.	Severe: slope.
Wellsboro--------	Severe: slope, wetness.	Severe: slope.	Severe: slope, wetness.	Severe: slope.	Severe: slope, frost action.	Severe: slope.
LeB---------------- Lewbeach	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: wetness, frost action.	Moderate: small stones, droughty.
LeC---------------- Lewbeach	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Moderate: wetness, slope, frost action.	Moderate: small stones, droughty.
LeD, LeE---------- Lewbeach	Severe: wetness, slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Severe: slope.	Severe: slope.
LfF, LgF---------- Lewbeach	Severe: wetness, slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
LlC*:						
Lewbeach---------	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Moderate: wetness, slope, frost action.	Severe: small stones.
Willowemoc-------	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Severe: frost action.	Severe: small stones, droughty.
LlD*:						
Lewbeach---------	Severe: wetness, slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
LlD*:						
Willowemoc-------	Severe: wetness, slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Severe: slope, frost action.	Severe: small stones, droughty, slope.
LmC*:						
Lewbeach---------	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Moderate: wetness, slope, frost action.	Severe: small stones.
Willowemoc-------	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Severe: frost action.	Severe: small stones, droughty.
LmD*:						
Lewbeach---------	Severe: wetness, slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
Willowemoc-------	Severe: wetness, slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Severe: slope, frost action.	Severe: small stones, droughty, slope.
LoA--------------- Lordstown	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: depth to rock.	Moderate: depth to rock, frost action.	Moderate: large stones.
LoB--------------- Lordstown	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: slope, depth to rock.	Moderate: depth to rock, frost action.	Moderate: large stones.
LoC--------------- Lordstown	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: slope, depth to rock, frost action.	Moderate: large stones, slope.
LoD--------------- Lordstown	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: slope.
Lv, Ly------------ Lyons	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
MaB--------------- Maplecrest	Slight---------	Slight---------	Slight---------	Moderate: slope.	Moderate: frost action.	Moderate: small stones.
MaC--------------- Maplecrest	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: small stones, slope.
MaD, MaE---------- Maplecrest	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
MdB--------------- Mardin	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: slope, wetness.	Moderate: frost action, wetness.	Moderate: small stones.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
MdC--------------- Mardin	Severe: wetness.	Moderate: slope, wetness.	Severe: wetness.	Severe: slope.	Moderate: slope, frost action, wetness.	Moderate: small stones, slope.
MdD--------------- Mardin	Severe: slope, wetness.	Severe: slope.	Severe: slope, wetness.	Severe: slope.	Severe: slope.	Severe: slope.
MeC--------------- Mardin	Severe: wetness.	Moderate: slope, wetness.	Severe: wetness.	Severe: slope.	Moderate: slope, frost action, wetness.	Moderate: large stones, wetness, slope.
Mf*. Medisaprists						
Mh*: Medisaprists.						
Hydraquents.						
Mk---------------- Middlebury	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding, frost action.	Severe: wetness.
MoA, MoB---------- Morris	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action, wetness.	Severe: wetness.
MoC, MpC---------- Morris	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: slope, wetness.	Severe: frost action, wetness.	Severe: wetness.
NaC, NrC---------- Nassau	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: thin layer.
NrD, NrE---------- Nassau	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, thin layer.
NuB--------------- Nunda	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Severe: frost action.	Moderate: wetness.
NuC--------------- Nunda	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Severe: frost action.	Moderate: wetness, slope.
NuD, NuE---------- Nunda	Severe: wetness, slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Severe: slope, frost action.	Severe: slope.
NvC--------------- Nunda	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Severe: frost action.	Severe: small stones.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
NvE---------------- Nunda	Severe: wetness, slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Severe: slope, frost action.	Severe: small stones, slope.
Oc*. Ochrepts						
OnB---------------- Onteora	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness, droughty.
OnC---------------- Onteora	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, slope.	Severe: wetness, frost action.	Severe: wetness, droughty.
OoC, OpC----------- Onteora	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, slope.	Severe: wetness, frost action.	Severe: small stones, wetness, droughty.
OrB---------------- Oquaga	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: slope, depth to rock.	Moderate: depth to rock, frost action.	Severe: small stones.
OrC---------------- Oquaga	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: slope, depth to rock, frost action.	Severe: small stones.
OrD---------------- Oquaga	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
OsC*:						
Oquaga------------	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: slope, depth to rock, frost action.	Severe: small stones.
Arnot-------------	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: thin layer.
OsD*, OsF*:						
Oquaga------------	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
Arnot-------------	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, thin layer.
Pg*, Pr*. Pits						
RhA---------------- Riverhead	Severe: cutbanks cave.	Slight----------	Slight----------	Slight----------	Moderate: frost action.	Slight.
RhB---------------- Riverhead	Severe: cutbanks cave.	Slight----------	Slight----------	Moderate: slope.	Moderate: frost action.	Slight.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
RhC: Riverhead	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
RhD: Riverhead	Severe: slope, cutbanks cave.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Sh: Shaker	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness, frost action.	Severe: wetness.
Su: Suny	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness, droughty.
Ta: Tioga	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
To, Tr: Tor	Severe: depth to rock, wetness.	Severe: wetness, depth to rock.	Severe: wetness, depth to rock.	Severe: wetness, depth to rock.	Severe: depth to rock, wetness, frost action.	Severe: wetness, depth to rock.
Ts: Tuller	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness, frost action.	Severe: wetness, thin layer.
Tt: Tuller	Severe: depth to rock, wetness.	Severe: wetness, depth to rock.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness, frost action.	Severe: wetness, thin layer.
TuA: Tunkhannock	Severe: cutbanks cave.	Moderate: large stones.	Moderate: large stones.	Moderate: large stones.	Moderate: large stones.	Severe: small stones.
TuB: Tunkhannock	Severe: cutbanks cave.	Moderate: large stones.	Moderate: large stones.	Moderate: slope, large stones.	Moderate: large stones.	Severe: small stones.
TuC: Tunkhannock	Severe: cutbanks cave.	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: slope.	Moderate: slope, large stones.	Severe: small stones.
TuD: Tunkhannock	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
TvB: Tunkhannock	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Moderate: small stones, large stones, droughty.
TwE*: Tunkhannock	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
TwE*:						
Chenango	Severe: slope, cutbanks cave.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Ud*. Udipsamments						
Ur*. Udorthents						
VaB Valois	Slight	Slight	Slight	Moderate: slope.	Moderate: frost action.	Moderate: small stones, droughty.
VaC Valois	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: small stones, droughty.
VaD, VaF, VbE, VbF Valois	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
VdB*:						
Valois	Slight	Slight	Slight	Moderate: slope.	Moderate: frost action.	Moderate: small stones, droughty.
Nassau	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: thin layer.
VdD*:						
Valois	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Nassau	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, thin layer.
VeB Vly	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: slope, depth to rock.	Moderate: depth to rock, frost action.	Severe: small stones, droughty.
VeC Vly	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope, frost action.	Severe: small stones, droughty.
VeD Vly	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: small stones, droughty, slope.
VhC*:						
Vly	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope, frost action.	Severe: small stones, droughty.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
VhC*:						
Halcott----------	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: depth to rock.
VhD*, VhF*:						
Vly--------------	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: small stones, droughty, slope.
Halcott----------	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.
VoA, VoB---------- Volusia	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness, droughty.
VoC, VpC---------- Volusia	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, slope.	Severe: wetness, frost action.	Severe: wetness, droughty.
Wa---------------- Wayland	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
WeB--------------- Wellsboro	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: slope, wetness.	Severe: frost action.	Moderate: large stones.
WeC--------------- Wellsboro	Severe: wetness.	Moderate: slope, wetness.	Severe: wetness.	Severe: slope.	Severe: frost action.	Moderate: slope, large stones.
WeD--------------- Wellsboro	Severe: slope, wetness.	Severe: slope.	Severe: slope, wetness.	Severe: slope.	Severe: slope, frost action.	Severe: slope.
WmB--------------- Willowemoc	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Severe: frost action.	
WmC--------------- Willowemoc	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Severe: frost action.	
WmD--------------- Willowemoc	Severe: wetness, slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Severe: slope, frost action.	

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Ad, Am-------------- Alden	Severe: ponding, percs slowly.	Slight-----------	Severe: ponding.	Severe: ponding.	Poor: ponding.
ArA, ArB------------ Arnot	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, small stones.
ArC----------------- Arnot	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, small stones.
AsC*:					
Arnot--------------	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, small stones.
Lordstown----------	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, small stones.
AsD*, AsE*:					
Arnot--------------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Lordstown----------	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Poor: area reclaim, slope, small stones.
AuC*:					
Arnot--------------	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, small stones.
Lordstown----------	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, small stones.
AvD*, AvE*:					
Arnot--------------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Lordstown----------	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Poor: area reclaim, slope, small stones.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
AwC*:					
Arnot	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, small stones.
Oquaga	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, small stones.
AwD*, AwE*:					
Arnot	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Oquaga	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Ba: Barbour	Severe: flooding, wetness, poor filter.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, small stones.
Bs: Basher	Severe: flooding, wetness.	Severe: flooding, wetness, seepage.	Severe: flooding, wetness, seepage.	Severe: flooding, wetness.	Poor: seepage, too sandy, small stones.
BuA: Burdett	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Severe: wetness.	Poor: wetness.
BuB: Burdett	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Poor: wetness.
BuC, BvC: Burdett	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Severe: wetness.	Poor: wetness.
BwB: Busti	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, small stones.
Ca: Canandaigua	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Cc: Carlisle	Severe: subsides, ponding, percs slowly.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding, excess humus.	Severe: seepage, ponding.	Poor: ponding, excess humus.
ChB: Chautauqua	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Severe: small stones.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
ChC------------------ Chautauqua	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness.	Moderate: wetness, slope.	Severe: small stones.
CnA, CnB------------- Chenango	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
CnC------------------ Chenango	Severe: poor filter.	Severe: slope, seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
Co*:					
Covington-----------	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, wetness, hard to pack.
Madalin-------------	Severe: percs slowly, wetness.	Slight-----------	Severe: wetness, too clayey.	Severe: wetness.	Poor: wetness, too clayey, hard to pack.
Du*. Dumps					
ElB------------------ Elka	Moderate: percs slowly.	Moderate: seepage, slope.	Slight-----------	Slight-----------	Fair: small stones.
ElC------------------ Elka	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: small stones, slope.
ElD------------------ Elka	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
EmC------------------ Elka	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: small stones, slope.
EmD, EmF------------- Elka	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
EnA------------------ Elmridge	Severe: wetness, percs slowly.	Slight-----------	Severe: wetness, too clayey.	Severe: seepage.	Poor: too clayey, hard to pack.
EnB------------------ Elmridge	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness, too clayey.	Severe: seepage.	Poor: too clayey, hard to pack.
FaC------------------ Farmington	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim.
FaD, FaE------------- Farmington	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Fu*:					
Fluvaquents.					
Udifluvents.					
GfB*:					
Galway	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock.	Poor: area reclaim, small stones.
Farmington	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim.
GfC*:					
Galway	Severe: depth to rock, wetness.	Severe: depth to rock, slope, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock.	Poor: area reclaim, small stones.
Farmington	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim.
GfD*:					
Galway	Severe: depth to rock, wetness, slope.	Severe: depth to rock, slope, wetness.	Severe: depth to rock, slope, wetness.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Farmington	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
HaB Halcott	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock, small stones.
HaC Halcott	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock, small stones.
HlC*:					
Halcott	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock, small stones.
Vly	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock, small stones.
HlD*, HlE*:					
Halcott	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, small stones, slope.
Vly	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, small stones, slope.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
HvB*:					
Hudson	Severe: percs slowly, wetness.	Moderate: slope.	Severe: wetness, too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
Vergennes	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack.
HvC*:					
Hudson	Severe: percs slowly, wetness.	Severe: slope.	Severe: wetness, too clayey.	Moderate: wetness, slope.	Poor: too clayey, hard to pack.
Vergennes	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack.
HvE*:					
Hudson	Severe: slope, percs slowly, wetness.	Severe: slope.	Severe: slope, too clayey, wetness.	Severe: slope.	Poor: slope, too clayey, hard to pack.
Vergennes	Severe: wetness, percs slowly, slope.	Severe: slope, wetness.	Severe: wetness, slope, too clayey.	Severe: wetness, slope.	Poor: too clayey, hard to pack, slope.
HwC3*:					
Hudson	Severe: percs slowly, wetness.	Severe: slope.	Severe: wetness, too clayey.	Moderate: wetness, slope.	Poor: too clayey, hard to pack.
Vergennes	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack.
HwD3*:					
Hudson	Severe: slope, percs slowly, wetness.	Severe: slope.	Severe: slope, too clayey, wetness.	Severe: slope.	Poor: slope, too clayey, hard to pack.
Vergennes	Severe: wetness, percs slowly, slope.	Severe: slope, wetness.	Severe: wetness, slope, too clayey.	Severe: wetness, slope.	Poor: too clayey, hard to pack, slope.
KrA*:					
Kingsbury	Severe: wetness, percs slowly.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Rhinebeck	Severe: percs slowly, wetness.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
KrB*:					
Kingsbury	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Rhinebeck	Severe: percs slowly, wetness.	Moderate: slope.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack. wetness.
LaB: Lackawanna	Severe: wetness, percs slowly.	Moderate: seepage, slope.	Moderate: wetness.	Moderate: wetness.	Poor: small stones.
LaC: Lackawanna	Severe: wetness, percs slowly.	Severe: slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Poor: small stones.
LaD, LaE: Lackawanna	Severe: wetness, percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
LcC*:					
Lackawanna	Severe: wetness, percs slowly.	Severe: slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Poor: small stones.
Wellsboro	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Moderate: wetness, slope.	Poor: small stones.
LcD*:					
Lackawanna	Severe: wetness, percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
Wellsboro	Severe: slope, wetness, percs slowly.	Severe: slope.	Severe: slope, wetness.	Severe: slope.	Poor: slope, small stones.
LeB: Lewbeach	Severe: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Poor: seepage, small stones.
LeC: Lewbeach	Severe: wetness, percs slowly.	Severe: slope, wetness.	Moderate: wetness, slope.	Moderate: wetness, slope.	Poor: seepage, small stones.
LeD, LeE, LfF, LgF: Lewbeach	Severe: wetness, percs slowly, slope.	Severe: slope, wetness.	Severe: slope.	Severe: slope.	Poor: seepage, small stones, slope.
LlC*:					
Lewbeach	Severe: wetness, percs slowly.	Severe: slope, wetness.	Moderate: wetness, slope.	Moderate: wetness, slope.	Poor: seepage, small stones.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
LlC*:					
Willowemoc	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness.	Moderate: wetness, slope.	Poor: small stones.
LlD*:					
Lewbeach	Severe: wetness, percs slowly, slope.	Severe: slope, wetness.	Severe: slope.	Severe: slope.	Poor: seepage, small stones, slope.
Willowemoc	Severe: wetness, percs slowly, slope.	Severe: slope, wetness.	Severe: wetness, slope.	Severe: slope.	Poor: small stones, slope.
LmC*:					
Lewbeach	Severe: wetness, percs slowly.	Severe: slope, wetness.	Moderate: wetness, slope.	Moderate: wetness, slope.	Poor: seepage, small stones.
Willowemoc	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness.	Moderate: wetness, slope.	Poor: small stones.
LmD*:					
Lewbeach	Severe: wetness, percs slowly, slope.	Severe: slope, wetness.	Severe: slope.	Severe: slope.	Poor: seepage, small stones, slope.
Willowemoc	Severe: wetness, percs slowly, slope.	Severe: slope, wetness.	Severe: wetness, slope.	Severe: slope.	Poor: small stones, slope.
LoA, LoB: Lordstown	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, small stones.
LoC: Lordstown	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, small stones.
LoD: Lordstown	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Poor: area reclaim, slope, small stones.
Lv: Lyons	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Severe: wetness.	Poor: wetness.
Ly: Lyons	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Severe: wetness.	Poor: small stones, wetness.
MaB: Maplecrest	Moderate: percs slowly.	Severe: seepage.	Severe: seepage.	Slight	Poor: small stones.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
MaC----------------- Maplecrest	Moderate: percs slowly, slope.	Severe: seepage, slope.	Severe: seepage.	Moderate: slope.	Poor: small stones.
MaD, MaE------------ Maplecrest	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: slope.	Poor: small stones, slope.
MdB----------------- Mardin	Severe: percs slowly, wetness.	Moderate: slope, seepage.	Severe: wetness.	Moderate: wetness.	Poor: small stones.
MdC----------------- Mardin	Severe: percs slowly, wetness.	Severe: slope.	Severe: wetness.	Moderate: slope, wetness.	Poor: small stones.
MdD----------------- Mardin	Severe: slope, percs slowly, wetness.	Severe: slope.	Severe: slope, wetness.	Severe: slope.	Poor: slope, small stones.
MeC----------------- Mardin	Severe: percs slowly, wetness.	Severe: slope.	Severe: wetness.	Moderate: slope, wetness.	Poor: small stones.
Mf*. Medisaprists					
Mh*: Medisaprists.					
Hydraquents.					
Mk------------------ Middlebury	Severe: flooding, wetness, poor filter.	Severe: flooding, wetness, seepage.	Severe: flooding, wetness, seepage.	Severe: flooding, wetness.	Poor: wetness.
MoA----------------- Morris	Severe: percs slowly, wetness.	Slight-----------	Severe: wetness.	Severe: wetness.	Poor: wetness, small stones.
MoB----------------- Morris	Severe: percs slowly, wetness.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Poor: wetness, small stones.
MoC----------------- Morris	Severe: percs slowly, wetness.	Severe: slope.	Severe: wetness.	Severe: wetness.	Poor: wetness, small stones.
MpC----------------- Morris	Severe: percs slowly, wetness.	Severe: slope.	Severe: wetness.	Severe: wetness.	Poor: wetness.
NaC, NrC------------ Nassau	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, small stones.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
NrD, NrE------------ Nassau	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Poor: slope, area reclaim, small stones.
NuB----------------- Nunda	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey, small stones.
NuC----------------- Nunda	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness.	Moderate: wetness, slope.	Fair: too clayey, small stones, slope.
NuD, NuE------------ Nunda	Severe: wetness, percs slowly, slope.	Severe: slope, wetness.	Severe: wetness, slope.	Severe: slope.	Poor: slope.
NvC----------------- Nunda	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness.	Moderate: wetness, slope.	Fair: too clayey, small stones, slope.
NvE----------------- Nunda	Severe: wetness, percs slowly, slope.	Severe: slope, wetness.	Severe: wetness, slope.	Severe: slope.	Poor: slope.
Oc*. Ochrepts					
OnB----------------- Onteora	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: small stones, wetness.
OnC, OoC, OpC------- Onteora	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness.	Severe: wetness.	Poor: small stones, wetness.
OrB----------------- Oquaga	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, small stones.
OrC----------------- Oquaga	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, small stones.
OrD----------------- Oquaga	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
OsC*:					
Oquaga-------------	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, small stones.
Arnot--------------	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, small stones.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
OsD*, OsF*:					
Oquaga	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Arnot	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Pg*, Pr*. Pits					
RhA, RhB Riverhead	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
RhC Riverhead	Severe: poor filter.	Severe: slope, seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
RhD Riverhead	Severe: poor filter, slope.	Severe: slope, seepage.	Severe: slope, seepage, too sandy.	Severe: slope, seepage.	Poor: seepage, too sandy, slope.
Sh Shaker	Severe: wetness, percs slowly.	Slight	Severe: wetness, too clayey.	Severe: wetness, seepage.	Poor: too clayey, wetness, hard to pack.
Su Suny	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: small stones, wetness.
Ta Tioga	Severe: flooding, wetness, poor filter.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: thin layer.
To, Tr Tor	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Poor: depth to rock, small stones, wetness.
Ts Tuller	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Poor: area reclaim, wetness, small stones.
Tt Tuller	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Poor: area reclaim, small stones, wetness.
TuA, TuB Tunkhannock	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
TuC------------------ Tunkhannock	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
TuD------------------ Tunkhannock	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, small stones.
TvB------------------ Tunkhannock	Severe: wetness, poor filter.	Severe: seepage, flooding.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, small stones.
TwE*:					
Tunkhannock--------	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, small stones.
Chenango-----------	Severe: poor filter, slope.	Severe: slope, seepage.	Severe: slope, seepage, too sandy.	Severe: slope, seepage.	Poor: seepage, too sandy, small stones.
Ud*. Udipsamments					
Ur*. Udorthents					
VaB------------------ Valois	Moderate: percs slowly.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: small stones.
VaC------------------ Valois	Moderate: percs slowly, slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Poor: small stones.
VaD, VaF, VbE, VbF-- Valois	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
VdB*:					
Valois-------------	Moderate: percs slowly.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: small stones.
Nassau-------------	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, small stones.
VdD*:					
Valois-------------	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
Nassau-------------	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Poor: slope, area reclaim, small stones.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
VeB------------------ Vly	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock, small stones.
VeC------------------ Vly	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock, small stones.
VeD------------------ Vly	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, small stones, slope.
VhC*:					
Vly-----------------	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock, small stones.
Halcott-------------	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock, small stones.
VhD*, VhF*:					
Vly-----------------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, small stones, slope.
Halcott-------------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, small stones, slope.
VoA, VoB------------ Volusia	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: small stones, wetness.
VoC------------------ Volusia	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Severe: wetness.	Poor: small stones, wetness.
VpC------------------ Volusia	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness.	Severe: wetness.	Poor: small stones, wetness.
Wa------------------- Wayland	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
WeB------------------ Wellsboro	Severe: percs slowly, wetness.	Moderate: slope.	Severe: wetness.	Moderate: wetness.	Poor: small stones.
WeC------------------ Wellsboro	Severe: percs slowly, wetness.	Severe: slope.	Severe: wetness.	Moderate: slope, wetness.	Poor: small stones.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
WeD: Wellsboro	Severe: slope, percs slowly, wetness.	Severe: slope.	Severe: slope, wetness.	Severe: slope, wetness.	Poor: slope, small stones.
WmB: Willowemoc	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Poor: small stones.
WmC: Willowemoc	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness.	Moderate: wetness, slope.	Poor: small stones.
WmD: Willowemoc	Severe: wetness, percs slowly, slope.	Severe: slope, wetness.	Severe: wetness, slope.	Severe: slope.	Poor: small stones, slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Ad, Am---------------- Alden	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, small stones, area reclaim.
ArA, ArB, ArC--------- Arnot	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
AsC*:				
Arnot----------------	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
Lordstown------------	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
AsD*:				
Arnot----------------	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Lordstown------------	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
AsE*:				
Arnot----------------	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Lordstown------------	Poor: slope, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
AuC*:				
Arnot----------------	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
Lordstown------------	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
AvD*, AvF*:				
Arnot----------------	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Lordstown------------	Poor: slope, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
AwC*:				
Arnot	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
Oquaga	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
AwD*:				
Arnot	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Oquaga	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
AwE*:				
Arnot	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Oquaga	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Ba Barbour	Good	Probable	Probable	Poor: small stones, area reclaim.
Bs Basher	Fair: wetness.	Probable	Probable	Poor: small stones, area reclaim.
BuA, BuB, BuC, BvC Burdett	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, wetness.
BwB Busti	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, area reclaim.
Ca Canandaigua	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Cc Carlisle	Poor: wetness.	Improbable: excess humus.	Improbable: excess humus.	Poor: excess humus, wetness.
ChB Chautauqua	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
ChC Chautauqua	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
CnA, CnB, CnC Chenango	Good	Probable	Probable	Poor: small stones, area reclaim.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Co*:				
Covington	Poor: wetness, shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
Madalin	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
Du*. Dumps				
ElB, ElC Elka	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
ElD Elka	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
EmC Elka	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
EmD, EmF Elka	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
EnA, EnB Elmridge	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
FaC Farmington	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
FaD, FaE Farmington	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Fu*: Fluvaquents.				
Udifluvents.				
GfB*, GfC*:				
Galway	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Farmington	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
GfD*:				
Galway	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Farmington	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
HaB, HaC: Halcott	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones.
HlC*:				
Halcott	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones.
Vly	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
HlD*:				
Halcott	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
Vly	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
HlE*:				
Halcott	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
Vly	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
HvB*:				
Hudson	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, too clayey.
Vergennes	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
HvC*:				
Hudson	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, too clayey.
Vergennes	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, slopes.
HvE*:				
Hudson	Poor: slope, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, thin layer, too clayey.
Vergennes	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
HwC3*:				
Hudson	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, too clayey.
Vergennes	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, slope.
HwD3*:				
Hudson	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, thin layer, too clayey.
Vergennes	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
KrA*, KrB*:				
Kingsbury	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
Rhinebeck	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, wetness.
LaB, LaC Lackawanna	Fair: wetness, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
LaD Lackawanna	Fair: wetness, slope, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
LaE Lackawanna	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
LcC*:				
Lackawanna	Fair: wetness, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Wellsboro	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
LcD*:				
Lackawanna	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Wellsboro	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones, area reclaim.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
LeB, LeC: Lewbeach	Fair: wetness.	Improbable: small stones.	Probable	Poor: small stones, area reclaim.
LeD: Lewbeach	Fair: wetness, slope.	Improbable: small stones.	Probable	Poor: small stones, area reclaim, slope.
LeE, LfF, LgF: Lewbeach	Poor: slope.	Improbable: small stones.	Probable	Poor: small stones, area reclaim, slope.
LlC*:				
Lewbeach	Fair: wetness.	Improbable: small stones.	Probable	Poor: small stones, area reclaim.
Willowemoc	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
LlD*:				
Lewbeach	Poor: slope.	Improbable: small stones.	Probable	Poor: small stones, area reclaim, slope.
Willowemoc	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
LmC*:				
Lewbeach	Fair: wetness.	Improbable: small stones.	Probable	Poor: small stones, area reclaim.
Willowemoc	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
LmD*:				
Lewbeach	Poor: slope.	Improbable: small stones.	Probable	Poor: small stones, area reclaim, slope.
Willowemoc	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
LoA, LoB, LoC: Lordstown	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
LoD: Lordstown	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Lv, Ly: Lyons	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, wetness.
MaB, MaC: Maplecrest	Good	Improbable: small stones.	Probable	Poor: small stones, area reclaim.
MaD: Maplecrest	Fair: slope.	Improbable: small stones.	Probable	Poor: small stones, area reclaim, slope.
MaE: Maplecrest	Poor: slope.	Improbable: small stones.	Probable	Poor: small stones, area reclaim, slope.
MdB, MdC: Mardin	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
MdD: Mardin	Fair: slope, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
MeC: Mardin	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
Mf*. Medisaprists				
Mh*: Medisaprists.				
Hydraquents.				
Mk: Middlebury	Poor: wetness.	Probable	Probable	Poor: small stones, area reclaim, wetness.
MoA, MoB, MoC, MpC: Morris	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
NaC, NrC: Nassau	Poor: thin layer, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
NrD: Nassau	Poor: thin layer, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, area reclaim, small stones.
NrE: Nassau	Poor: slope, thin layer, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, area reclaim, small stones.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
NuB, NuC: Nunda	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
NuD: Nunda	Fair: wetness, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
NuE: Nunda	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
NvC: Nunda	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
NvE: Nunda	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Oc*. Ochrepts				
OnB, OnC, OoC, OpC: Onteora	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, wetness.
OrB, OrC: Oquaga	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
OrD: Oquaga	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
OsC*:				
Oquaga	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Arnot	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
OsD*, OsF*:				
Oquaga	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Arnot	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Pg*, Pr*. Pits				
RhA, RhB, RhC: Riverhead	Good	Probable	Probable	Poor: small stones.
RhD: Riverhead	Fair: slope.	Probable	Probable	Poor: small stones, slope.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Sh: Shaker	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Su: Suny	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, wetness.
Ta: Tioga	Good	Probable	Probable	Poor: small stones, area reclaim.
To, Tr: Tor	Poor: depth to rock, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, wetness.
Ts, Tt: Tuller	Poor: area reclaim, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, wetness.
TuA, TuB, TuC: Tunkhannock	Fair: large stones.	Probable	Probable	Poor: small stones, area reclaim.
TuD: Tunkhannock	Fair: large stones, slope.	Probable	Probable	Poor: small stones, area reclaim, slope.
TvB: Tunkhannock	Good	Probable	Probable	Poor: small stones, area reclaim.
TwE*:				
Tunkhannock	Poor: slope.	Probable	Probable	Poor: small stones, area reclaim, slope.
Chenango	Poor: slope.	Probable	Probable	Poor: slope, small stones, area reclaim.
Ud*. Udipsamments				
Ur*. Udorthents				
VaB, VaC: Valois	Good	Improbable: small stones.	Probable	Poor: small stones, area reclaim.
VaD: Valois	Fair: slope.	Improbable: small stones.	Probable	Poor: small stones, area reclaim, slope.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
VaF, VbE, VbF: Valois	Poor: slope.	Improbable: small stones.	Probable	Poor: small stones, area reclaim, slope.
VdB*:				
Valois	Good	Improbable: small stones.	Probable	Poor: small stones, area reclaim.
Nassau	Poor: thin layer, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
VdD*:				
Valois	Fair: slope.	Improbable: small stones.	Probable	Poor: small stones, area reclaim, slope.
Nassau	Poor: thin layer, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, area reclaim, small stones.
VeB, VeC: Vly	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
VeD: Vly	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
VhC*:				
Vly	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Halcott	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones.
VhD*:				
Vly	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Halcott	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
VhF*:				
Vly	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Halcott	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
VoA, VoB, VoC--------- Volusia	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, wetness.
VpC------------------- Volusia	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, wetness.
Wa-------------------- Wayland	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
WeB, WeC-------------- Wellsboro	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
WeD------------------- Wellsboro	Fair: wetness, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones, area reclaim.
WmB, WmC-------------- Willowemoc	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
WmD------------------- Willowemoc	Fair: wetness, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
Ad: Alden	Slight	Severe: piping, wetness.	Slight	Percs slowly, frost action.	Erodes easily, wetness.	Wetness, erodes easily, rooting depth.
Am: Alden	Slight	Severe: piping, wetness.	Slight	Percs slowly, frost action.	Wetness, erodes easily.	Wetness, rooting depth, erodes easily.
ArA, ArB: Arnot	Severe: depth to rock.	Severe: seepage.	Severe: no water.	Deep to water	Large stones, depth to rock.	Large stones, droughty.
ArC: Arnot	Severe: depth to rock, slope.	Severe: seepage.	Severe: no water.	Deep to water	Large stones, slope, depth to rock.	Large stones, slope, droughty.
AsC*, AsD*, AsE*, AuC*, AvD*, AvF*:						
Arnot	Severe: depth to rock, slope.	Severe: seepage.	Severe: no water.	Deep to water	Large stones, slope, depth to rock.	Large stones, slope, droughty.
Lordstown	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, depth to rock.	Slope, droughty, depth to rock.
AwC*, AwD*, AwE*:						
Arnot	Severe: depth to rock, slope.	Severe: seepage.	Severe: no water.	Deep to water	Large stones, slope, depth to rock.	Large stones, slope, droughty.
Oquaga	Severe: slope.	Severe: seepage, piping, thin layer.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, droughty.
Ba: Barbour	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Deep to water	Too sandy	Droughty.
Bs: Basher	Moderate: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave, slow refill.	Flooding, frost action, cutbanks cave.	Wetness, too sandy.	Favorable.
BuA: Burdett	Moderate: seepage.	Severe: wetness.	Severe: no water.	Percs slowly, frost action.	Erodes easily, wetness.	Wetness, erodes easily.
BuB: Burdett	Moderate: seepage, slope.	Severe: wetness.	Severe: no water.	Percs slowly, frost action, slope.	Erodes easily, wetness.	Wetness, erodes easily.
BuC, BvC: Burdett	Severe: slope.	Severe: wetness.	Severe: no water.	Percs slowly, frost action, slope.	Slope, erodes easily, wetness.	Wetness, slope, erodes easily.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
BwB: Busti	Moderate: slope, seepage.	Severe: wetness.	Severe: no water.	Percs slowly, frost action, slope.	Wetness, percs slowly.	Wetness.
Ca: Canandaigua	Slight	Severe: piping, wetness.	Severe: slow refill.	Frost action	Erodes easily, wetness.	Wetness, erodes easily.
Cc: Carlisle	Severe: seepage.	Severe: excess humus, ponding.	Severe: slow refill.	Ponding, subsides, frost action.	Ponding, soil blowing.	Wetness.
ChB: Chautauqua	Moderate: seepage, slope.	Moderate: piping.	Severe: no water.	Slope	Wetness	Droughty.
ChC: Chautauqua	Severe: slope.	Moderate: piping.	Severe: no water.	Slope	Wetness, slope.	Slope, droughty.
CnA, CnB: Chenango	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Too sandy	Droughty.
CnC: Chenango	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, too sandy.	Slope, droughty.
Co*:						
Covington	Slight	Severe: hard to pack, wetness.	Severe: slow refill.	Percs slowly	Wetness, percs slowly, erodes easily.	Wetness, percs slowly, erodes easily.
Madalin	Slight	Severe: wetness.	Severe: slow refill.	Percs slowly, frost action.	Erodes easily, wetness, percs slowly.	Wetness, percs slowly, erodes easily.
Du*. Dumps						
ElB: Elka	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Favorable	Favorable.
ElC, ElD, EmC, EmD, EmF: Elka	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope	Slope.
EnA: Elmridge	Slight	Moderate: piping, hard to pack, wetness.	Severe: no water.	Percs slowly, frost action.	Wetness, percs slowly.	Erodes easily, percs slowly.
EnB: Elmridge	Moderate: slope.	Moderate: piping, hard to pack, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Wetness, percs slowly.	Erodes easily, percs slowly.
FaC, FaD, FaE: Farmington	Severe: depth to rock, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, depth to rock.	Slope, droughty, depth to rock.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
Fu*: Fluvaquents.						
Udifluvents.						
GfB*: Galway	Moderate: seepage, depth to rock, slope.	Severe: piping.	Severe: no water.	Depth to rock, slope.	Depth to rock, wetness.	Depth to rock, droughty.
Farmington	Severe: depth to rock.	Severe: piping.	Severe: no water.	Deep to water	Depth to rock	Droughty, depth to rock.
GfC*, GfD*: Galway	Severe: slope.	Severe: piping.	Severe: no water.	Depth to rock, slope.	Slope, depth to rock, wetness.	Slope, depth to rock, droughty.
Farmington	Severe: depth to rock, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, depth to rock.	Slope, droughty, depth to rock.
HaB Halcott	Severe: depth to rock.	Severe: seepage.	Severe: no water.	Deep to water	Large stones, depth to rock.	Large stones, droughty.
HaC Halcott	Severe: depth to rock, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, droughty.
HlC*, HlD*, HlE*: Halcott	Severe: depth to rock, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, droughty.
Vly	Severe: slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, droughty.
HvB*: Hudson	Moderate: slope.	Moderate: hard to pack, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Erodes easily, wetness.	Percs slowly, erodes easily.
Vergennes	Moderate: slope.	Severe: hard to pack, wetness.	Severe: slow refill.	Percs slowly, slope.	Erodes easily, wetness.	Wetness, erodes easily.
HvC*, HvE*, HwC3*, HwD3*: Hudson	Severe: slope.	Moderate: hard to pack, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Slope, erodes easily, wetness.	Slope, percs slowly, erodes easily.
Vergennes	Severe: slope.	Severe: hard to pack, wetness.	Severe: slow refill.	Percs slowly, slope.	Slope, erodes easily, wetness.	Wetness, slope, erodes easily.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
KrA*:						
Kingsbury	Slight	Severe: hard to pack, wetness.	Severe: no water.	Percs slowly, frost action.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
Rhinebeck	Slight	Severe: wetness.	Severe: no water.	Percs slowly, frost action.	Erodes easily, wetness.	Wetness, erodes easily.
KrB*:						
Kingsbury	Moderate: slope.	Severe: hard to pack, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
Rhinebeck	Moderate: slope.	Severe: wetness.	Severe: no water.	Slope, percs slowly, frost action.	Erodes easily, wetness.	Wetness, erodes easily.
LaB Lackawanna	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Percs slowly, slope.	Percs slowly, wetness, rooting depth.	Percs slowly, rooting depth.
LaC, LaD, LaE Lackawanna	Severe: slope.	Severe: piping.	Severe: no water.	Percs slowly, slope.	Slope, percs slowly, wetness.	Percs slowly, slope, rooting depth.
LcC*, LcD*:						
Lackawanna	Severe: slope.	Severe: piping.	Severe: no water.	Percs slowly, slope.	Slope, wetness, rooting depth.	Slope, wetness, rooting depth.
Wellsboro	Severe: slope.	Severe: piping.	Severe: no water.	Percs slowly, frost action, slope.	Slope, large stones, wetness.	Large stones, rooting depth, slope.
LeB Lewbeach	Moderate: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Percs slowly, slope.	Wetness, rooting depth.	Droughty, rooting depth.
LeC, LeD, LeE, LfF, LgF Lewbeach	Severe: slope.	Severe: seepage, piping.	Severe: no water.	Percs slowly, slope.	Slope, wetness, rooting depth.	Slope, droughty, rooting depth.
LlC*, LlD*, LmC*, LmD*:						
Lewbeach	Severe: slope.	Severe: seepage, piping.	Severe: no water.	Percs slowly, slope.	Slope, wetness, rooting depth.	Slope, droughty, rooting depth.
Willowemoc	Severe: slope.	Severe: seepage, piping.	Severe: no water.	Percs slowly, frost action, slope.	Slope, wetness, percs slowly.	Slope, droughty, rooting depth.
LoA Lordstown	Moderate: seepage, depth to rock.	Severe: piping.	Severe: no water.	Deep to water	Depth to rock	Droughty, depth to rock.
LoB Lordstown	Moderate: seepage, depth to rock, slope.	Severe: piping.	Severe: no water.	Deep to water	Depth to rock	Droughty, depth to rock.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
LoC, LoD---------- Lordstown	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, depth to rock.	Slope, droughty, depth to rock.
Lv, Ly------------ Lyons	Slight---------	Severe: wetness.	Severe: slow refill.	Percs slowly, frost action.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, rooting depth.
MaB--------------- Maplecrest	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Favorable------	Favorable.
MaC, MaD, MaE----- Maplecrest	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope----------	Slope.
MdB--------------- Mardin	Moderate: slope.	Moderate: piping.	Severe: no water.	Slope, percs slowly.	Wetness, rooting depth, percs slowly.	Wetness, rooting depth, percs slowly.
MdC, MdD---------- Mardin	Severe: slope.	Moderate: piping.	Severe: no water.	Slope, percs slowly.	Slope, wetness, rooting depth.	Slope, wetness, rooting depth.
MeC--------------- Mardin	Severe: slope.	Moderate: piping.	Severe: no water.	Slope, percs slowly.	Slope, large stones, wetness.	Slope, large stones, rooting depth.
Mf*. Medisaprists						
Mh*: Medisaprists.						
Hydraquents.						
Mk---------------- Middlebury	Moderate: seepage.	Severe: piping, wetness.	Severe: cutbanks cave.	Flooding, frost action, cutbanks cave.	Wetness--------	Wetness.
MoA--------------- Morris	Slight---------	Severe: piping, wetness.	Severe: no water.	Percs slowly, frost action.	Percs slowly, wetness, rooting depth.	Wetness, rooting depth, percs slowly.
MoB--------------- Morris	Moderate: slope.	Severe: piping, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Percs slowly, wetness, rooting depth.	Wetness, rooting depth, percs slowly.
MoC--------------- Morris	Severe: slope.	Severe: piping, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Percs slowly, wetness, slope.	Wetness, rooting depth, slope.
MpC--------------- Morris	Severe: slope.	Severe: piping, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Slope, wetness, large stones.	Slope, wetness, large stones.
NaC, NrC, NrD, NrE-------------- Nassau	Severe: depth to rock, slope.	Severe: seepage, thin layer.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Slope, large stones, droughty.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
NuB---------------- Nunda	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Frost action, slope.	Erodes easily, wetness.	Erodes easily.
NuC, NuD, NuE----- Nunda	Severe: slope.	Severe: piping.	Severe: no water.	Frost action, slope.	Slope, erodes easily, wetness.	Slope, erodes easily.
NvC, NvE---------- Nunda	Severe: slope.	Severe: piping.	Severe: no water.	Frost action, slope.	Slope, wetness, percs slowly.	Slope.
Oc*. Ochrepts						
OnB---------------- Onteora	Moderate: slope.	Severe: seepage, piping, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Wetness, rooting depth.	Wetness, droughty.
OnC---------------- Onteora	Severe: slope.	Severe: seepage, piping, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Slope, wetness, rooting depth.	Wetness, slope, droughty.
OoC, OpC---------- Onteora	Severe: slope.	Severe: seepage, piping, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Slope, wetness.	Wetness, slope.
OrB---------------- Oquaga	Moderate: seepage, depth to rock, slope.	Severe: seepage, piping, thin layer.	Severe: no water.	Deep to water	Large stones, depth to rock.	Large stones, droughty.
OrC, OrD---------- Oquaga	Severe: slope.	Severe: seepage, piping, thin layer.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, droughty.
OsC*, OsD*, OsF*:						
Oquaga-----------	Severe: slope.	Severe: seepage, piping, thin layer.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, droughty.
Arnot------------	Severe: depth to rock, slope.	Severe: seepage.	Severe: no water.	Deep to water	Large stones, slope, depth to rock.	Large stones, slope, droughty.
Pg*, Pr*. Pits						
RhA, RhB---------- Riverhead	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Too sandy------	Favorable.
RhC, RhD---------- Riverhead	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, too sandy.	Slope.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
Sh----------------- Shaker	Slight---------	Severe: wetness.	Severe: slow refill.	Percs slowly, frost action.	Wetness, percs slowly, erodes easily.	Wetness, percs slowly, erodes easily.
Su----------------- Suny	Slight---------	Severe: seepage, piping, wetness.	Severe: no water.	Percs slowly, frost action.	Wetness, percs slowly.	Wetness, droughty, rooting depth.
Ta----------------- Tioga	Severe: seepage.	Severe: piping.	Severe: cutbanks cave.	Deep to water	Erodes easily	Erodes easily, droughty.
To, Tr------------- Tor	Severe: depth to rock.	Severe: thin layer, wetness.	Severe: no water.	Percs slowly, depth to rock, frost action.	Large stones, depth to rock, wetness.	Large stones, wetness, droughty.
Ts----------------- Tuller	Severe: depth to rock.	Severe: thin layer, wetness.	Severe: no water.	Percs slowly, depth to rock, frost action.	Depth to rock, wetness, large stones.	Wetness, large stones, droughty.
Tt----------------- Tuller	Severe: depth to rock.	Severe: thin layer, wetness.	Severe: no water.	Percs slowly, depth to rock, frost action.	Large stones, depth to rock, wetness.	Large stones, wetness, droughty.
TuA, TuB----------- Tunkhannock	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Large stones, too sandy.	Large stones, droughty.
TuC, TuD----------- Tunkhannock	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, large stones, too sandy.	Large stones, slope, droughty.
TvB---------------- Tunkhannock	Poor: seepage.	Severe: seepage.	Severe: cutbanks cave.	Deep to water	Large stones, too sandy.	Large stones, droughty.
TwE*:						
Tunkhannock-------	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, large stones, too sandy.	Large stones, slope, droughty.
Chenango----------	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, too sandy.	Slope, droughty.
Ud*. Udipsamments						
Ur*. Udorthents						
VaB---------------- Valois	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Favorable-------	Droughty.
VaC, VaD, VaF, VbE, VbF---------- Valois	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope-----------	Slope, droughty.
VdB*:						
Valois------------	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Favorable-------	Droughty.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
VdB*:						
Nassau	Severe: depth to rock.	Severe: seepage, thin layer.	Severe: no water.	Deep to water	Large stones, depth to rock.	Large stones, droughty, depth to rock.
VdD*:						
Valois	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope	Slope, droughty.
Nassau	Severe: depth to rock, slope.	Severe: seepage, thin layer.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Slope, large stones, droughty.
VeB Vly	Moderate: seepage, depth to rock, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Large stones, depth to rock.	Large stones, droughty.
VeC, VeD Vly	Severe: slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, droughty.
VhC*, VhD*, VhF*:						
Vly	Severe: slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, droughty.
Halcott	Severe: depth to rock, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, droughty.
VoA Volusia	Slight	Severe: piping, wetness.	Severe: no water.	Percs slowly, frost action.	Large stones	Large stones, wetness.
VoB Volusia	Moderate: slope.	Severe: piping, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Large stones	Large stones, wetness.
VoC Volusia	Severe: slope.	Severe: piping, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Slope, large stones.	Large stones, wetness, slope.
VpC Volusia	Severe: slope.	Severe: wetness.	Severe: no water.	Percs slowly, frost action, slope.	Slope, large stones, wetness.	Large stones, wetness, slope.
Wa Wayland	Slight	Severe: piping, wetness.	Severe: slow refill.	Percs slowly, flooding, frost action.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
WeB Wellsboro	Moderate: slope.	Severe: piping.	Severe: no water.	Percs slowly, frost action, slope.	Wetness, rooting depth, percs slowly.	Rooting depth, percs slowly.
WeC, WeD Wellsboro	Severe: slope.	Severe: piping.	Severe: no water.	Percs slowly, frost action, slope.	Wetness, rooting depth, slope.	Rooting depth, percs slowly, slope.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
WmB---------------- Willowemoc	Moderate: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Percs slowly, frost action, slope.	Wetness, rooting depth.	Droughty, rooting depth.
WmC, WmD----------- Willowemoc	Severe: slope.	Severe: seepage, piping.	Severe: no water.	Percs slowly, frost action, slope.	Slope, wetness, rooting depth.	Slope, droughty, rooting depth.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments >3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
Ad------------ Alden	0-9	Silt loam-----	ML, OL	A-7, A-5	0	80-100	75-100	65-95	55-85	40-50	5-15
	9-35	Silt loam, channery silt loam, silty clay loam, very fine sandy loam.	CL, CL-ML	A-4, A-6	0	80-100	75-100	65-95	55-85	20-35	5-15
	35-60	Channery loam, channery silt loam, fine sandy loam, silty clay loam.	CL, GC, SC, CL-ML	A-2, A-4, A-6	0-5	60-95	50-90	45-90	30-85	20-35	5-15
Am------------ Alden	0-9	Silt loam-----	ML, OL	A-7, A-5	3-10	80-100	75-100	65-95	55-85	40-50	5-15
	9-35	Silt loam, channery silt loam, silty clay loam, very fine sandy loam.	CL, CL-ML	A-4, A-6	0	80-100	75-100	65-95	55-85	20-35	5-15
	35-60	Gravelly loam, fine sandy loam, channery silt loam, silty clay loam.	CL, GC, SC, CL-ML	A-2, A-4, A-6	0-5	60-95	50-90	45-90	30-85	20-35	5-15
ArA, ArB, ArC- Arnot	0-1	Channery silt loam.	ML, GM, SM	A-2, A-4, A-5	5-10	60-85	55-80	45-80	30-70	35-45	1-9
	1-12	Very channery silt loam, very channery loam.	GM	A-2, A-4, A-1	10-25	30-60	25-55	20-55	15-50	20-35	1-9
	12	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
AsC*, AsD*, AsE*, AuC*, AvD*, AvF*:											
Arnot--------	0-1	Channery silt loam.	ML, GM, SM	A-2, A-4, A-5	5-10	60-85	55-80	45-80	30-70	35-45	1-9
	1-12	Very channery silt loam, very channery loam.	GM	A-2, A-4, A-1	10-25	30-60	25-55	20-55	15-50	20-35	1-9
	12	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification Unified	Classification AASHTO	Frag- ments >3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
AsC*, AsD*, AsE*, AuC*, AvD*, AvF*:											
Lordstown---	0-5	Channery silt loam.	ML, GM, SM	A-4	5-20	65-85	50-75	45-70	40-65	<30	NP-4
	5-21	Channery silt loam, channery loam.	ML, GM, SM	A-4	5-10	65-85	50-75	45-70	40-65	<30	NP-4
	21-26	Very channery loam, channery silt loam, very channery fine sandy loam.	ML, GM, SM	A-2, A-4, A-1	5-25	40-75	30-70	25-70	15-60	<30	NP-4
	26	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
AwC*, AwD*, AwE*:											
Arnot-------	0-1	Channery silt loam.	ML, GM, SM	A-2, A-4, A-5	5-10	60-85	55-80	45-80	30-70	35-45	1-9
	1-12	Very channery silt loam, very channery loam.	GM	A-2, A-4, A-1	10-25	30-60	25-55	20-55	15-50	20-35	1-9
	12	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Oquaga------	0-8	Very channery silt loam.	GM, ML, SM	A-1, A-2, A-4, A-5	10-25	35-70	25-60	20-60	15-55	35-45	2-7
	8-22	Very channery loam, very channery silt loam.	GM, ML, SM, GM-GC	A-1, A-2, A-4	10-25	35-70	25-60	20-60	15-55	20-30	2-7
	22	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Ba------------ Barbour	0-9	Loam----------	ML, CL-ML, SM, SM-SC	A-4, A-2	0	80-100	75-100	50-95	30-90	15-25	2-7
	9-28	Loam, silt loam, fine sandy loam, gravelly loam.	ML, SM, CL-ML, SM-SC	A-4, A-2, A-1	0	60-100	55-95	30-95	15-85	15-25	2-7
	28-78	Loamy sand, very gravelly coarse sand, gravelly loamy fine sand.	SM, SP, GM, GP	A-1, A-2, A-3, A-4	0-5	35-95	30-95	20-80	2-40	---	NP

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments >3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
Bs------------ Basher	0-8	Silt loam-----	ML, CL-ML, SM, SM-SC	A-4, A-2, A-1	0-5	80-100	75-100	45-100	20-90	15-25	2-7
	8-22	Silt loam, loam, gravelly sandy loam.	SM, ML, CL-ML, SM-SC	A-4, A-2, A-1	0-5	75-100	70-100	40-100	20-90	15-25	2-7
	22-43	Silt loam, gravelly loam, loam.	SM, ML, CL-ML, SM-SC	A-4, A-2, A-1	0-5	75-100	70-100	40-100	20-90	15-25	2-7
	43-60	Loam, gravelly loamy sand, very gravelly sand.	GP, SW, SM, ML	A-1, A-2, A-4, A-3	0-5	30-100	25-100	10-85	1-55	---	NP
BuA, BuB, BuC- Burdett	0-9	Channery silt loam.	ML, SM, GM	A-4, A-7	0-5	65-75	60-70	55-65	40-60	35-45	5-15
	9-20	Silt loam, very fine sandy loam, channery silt loam.	ML, SM, CL, SC	A-4	0-5	75-95	70-90	60-85	40-80	20-30	2-10
	20-36	Channery clay loam, silty clay loam, channery loam.	CL, GM-GC, SC, CL-ML	A-4, A-6	5-10	65-85	60-80	50-75	40-65	20-30	5-15
	36-60	Channery loam, clay loam, channery silt loam.	CL, SC, GC, CL-ML	A-4, A-6	5-10	65-85	60-80	50-75	40-65	20-35	5-15
BvC----------- Burdett	0-9	Channery silt loam.	ML, SM, GM	A-4, A-7	5-10	65-75	60-70	55-65	40-60	35-45	5-15
	9-20	Silt loam, very fine sandy loam, channery silt loam.	ML, SM, CL, SC	A-4	0-5	75-95	70-90	60-85	40-80	20-30	2-10
	20-36	Channery clay loam, silty clay loam, channery loam.	CL, GM-GC, SC, CL-ML	A-4, A-6	5-10	65-85	60-80	50-75	40-65	20-30	5-15
	36-60	Channery loam, clay loam, channery silt loam.	CL, SC, GC, CL-ML	A-4, A-6	5-10	65-85	60-80	50-75	40-65	20-35	5-15
BwB----------- Busti	0-8	Silt loam-----	ML, SM, SM-SC	A-4, A-6	0-5	80-95	75-90	65-85	45-75	20-40	1-12
	8-26	Silt loam, loam, channery silt loam.	ML, GM, SM	A-4	0-5	55-95	50-90	45-85	35-75	15-25	NP-5
	26-60	Channery silt loam, gravelly loam.	ML, GM, SM	A-4	0-5	55-80	50-70	40-70	35-65	15-25	NP-5

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments >3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Ca-------------Canandaigua	0-7	Silt loam-----	ML, MH	A-4, A-5, A-7	0	95-100	95-100	90-100	85-100	35-55	5-15
	7-40	Silt loam, very fine sandy loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	95-100	95-100	90-100	70-95	20-40	5-15
	40-60	Silt loam, very fine sandy loam.	ML, CL, CL-ML	A-4	0	95-100	95-100	90-100	70-95	20-30	3-10
Cc-------------Carlisle	0-75	Muck-----------	PT	A-8	---	---	---	---	---	---	---
ChB, ChC-------Chautauqua	0-8	Loam-----------	ML, SM, CL-ML	A-4, A-6	0-5	80-95	75-90	65-85	45-75	20-40	1-12
	8-35	Channery silt loam, gravelly loam.	ML, GM, SM, CL-ML	A-4	0-5	55-80	50-75	45-70	35-65	15-25	NP-5
	35-60	Gravelly silt loam, very gravelly loam, gravelly loam.	GM, CL-ML, SM, GM-GC	A-2-4, A-4	0-5	50-75	45-70	40-65	30-60	15-25	NP-5
CnA, CnB, CnC-Chenango	0-4	Gravelly loam	ML, SM, GM	A-2, A-4, A-1	5-15	55-85	55-80	35-80	15-70	<35	NP-10
	4-26	Gravelly loam, gravelly fine sandy loam, very gravelly loam.	ML, GM, SM	A-2, A-4, A-1	5-10	35-80	30-75	25-75	15-65	<40	NP-10
	26-60	Very gravelly loamy coarse sand, very gravelly sand, very gravelly loamy sand.	GW, GM, SM, GP	A-1	5-10	25-65	20-60	10-50	1-20	---	NP
Co*:											
Covington----	0-7	Silty clay----	MH	A-7	0	100	95-100	95-100	90-100	40-80	10-40
	7-28	Clay-----------	CH, MH	A-7	0	100	95-100	95-100	95-100	50-80	20-40
	28-60	Clay-----------	CH, MH	A-7	0	100	95-100	95-100	95-100	50-80	20-40
Madalin-------	0-9	Silt loam-----	ML, MH, OL, OH	A-6, A-7	0	95-100	95-100	85-100	65-100	35-65	10-25
	9-30	Silty clay, clay, silty clay loam.	CH, CL	A-7, A-6	0	95-100	95-100	85-100	70-100	38-65	20-35
	30-60	Silty clay, clay, silty clay loam.	CL, CH	A-6, A-7	0	75-100	70-100	65-100	60-100	35-60	15-35
Du*. Dumps											

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
ElB, ElC, ElD-Elka	0-8	Channery loam	ML, GM, SM	A-2, A-4, A-1-b	5-10	55-80	50-75	35-70	20-60	<30	NP-5
	8-32	Channery loam, silt loam, sandy loam.	ML, SM	A-2, A-4, A-1-b	0-5	70-100	65-90	40-85	20-80	<30	NP-5
	32-60	Channery very fine sandy loam, silt loam, sandy loam.	ML, SM	A-2, A-4, A-1-b	0-10	70-100	65-90	40-85	20-80	<30	NP-5
EmC, EmD, EmF-Elka	0-8	Channery loam	ML, SM, GM	A-4, A-2	10-20	70-90	50-75	50-70	30-65	<30	NP-5
	8-32	Channery loam, silt loam, sandy loam.	ML, SM	A-4, A-2, A-1-b	0-5	70-100	65-90	40-85	20-80	<30	NP-5
	32-60	Channery very fine sandy loam, silt loam, sandy loam.	ML, SM	A-4, A-2, A-1-b	0-10	70-100	65-90	40-85	20-80	<30	NP-5
EnA, EnB------Elmridge	0-9	Very fine sandy loam.	SM, ML	A-2, A-4	0	100	95-100	60-95	30-60	---	NP
	9-28	Fine sandy loam, sandy loam, loam.	SM, ML	A-2, A-4	0	100	95-100	60-95	30-60	---	NP
	28-60	Silty clay loam, silty clay, clay.	CL, CL-ML	A-6, A-7	0	100	100	90-100	75-95	25-50	5-25
FaC, FaD, FaE:											
Farmington--	0-8	Gravelly silt loam.	ML, CL, GM, GC	A-2, A-4, A-6, A-1	0-5	55-80	50-75	35-70	20-65	20-35	3-15
	8-13	Silt loam, loam, gravelly fine sandy loam.	ML, CL, GM, GC	A-2, A-4, A-6, A-1	0-5	60-95	55-90	35-85	20-80	20-35	3-15
	13	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Fu*:											
Fluvaquents.											
Udifluvents.											
GfB*, GfC*, GfD*:											
Galway------	0-9	Gravelly silt loam.	ML, GM, SM	A-2, A-6, A-7	0-5	55-80	50-75	45-75	30-65	35-45	10-15
	9-26	Loam, silt loam, gravelly fine sandy loam.	ML, GM, GM-GC, CL-ML	A-2, A-4, A-1, A-6	0-5	60-95	50-95	35-90	20-75	20-40	3-15
	26	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments >3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
GfB*, GfC*, GfD*:											
Farmington--	0-8	Gravelly silt loam.	ML, CL, GM, GC	A-2, A-4, A-6, A-1	0-5	55-80	50-75	35-70	20-65	20-35	3-15
	8-13	Silt loam, loam, gravelly fine sandy loam.	ML, CL, GM, GC	A-2, A-4, A-6, A-1	0-5	60-95	55-90	35-85	20-80	20-35	3-15
	13	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
HaB, HaC------ Halcott	0-5	Channery silt loam.	ML, SM, GM	A-2, A-4, A-5	5-10	60-85	55-80	40-80	20-70	35-45	1-9
	5-13	Very channery silt loam, extremely channery silt loam, very channery fine sandy loam.	GM, GP-GM	A-2, A-4, A-5	5-20	30-60	20-55	15-55	10-50	35-45	1-9
	13	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
HlC*, HlD*, HlE*:											
Halcott-----	0-5	Channery silt loam.	ML, SM, GM	A-2, A-4, A-5	5-10	60-85	55-80	40-80	20-70	35-45	1-9
	5-13	Very channery silt loam, extremely channery silt loam, very channery fine sandy loam.	GM, GP-GM	A-2, A-4, A-5	5-20	30-60	20-55	15-55	10-50	35-45	1-9
	13	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Vly---------	0-2	Channery silt loam.	GM, ML, SM	A-2, A-4	10-25	30-70	25-60	20-60	15-55	35-45	1-9
	2-28	Extremely channery loam, very channery silt loam, very gravelly loam.	GM, ML, SM, GM-GC	A-1, A-2, A-4	10-25	30-70	25-60	20-60	15-55	20-30	1-9
	28	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments >3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
HvB*, HvC*, HvE*:											
Hudson------	0-8	Silt loam-----	ML, CL-ML, OL, CL	A-4, A-6, A-7	0	95-100	95-100	85-100	65-95	25-48	5-19
	8-13	Silty clay, silty clay loam.	CL, CH	A-7, A-6	0	95-100	90-100	80-100	80-100	35-65	15-35
	13-30	Silty clay, silty clay loam, silt loam.	CL, CH	A-7, A-6	0	95-100	90-100	80-100	80-100	35-65	15-35
	30-60	Silty clay, silt loam, clay.	CL, CH	A-7, A-6	0	95-100	90-100	80-100	60-100	35-65	15-35
Vergennes---	0-17	Loam, clay loam.	MH, CH	A-7	0	100	100	90-100	85-100	40-80	20-40
	17-34	Clay----------	MH, CH	A-7	0	100	100	95-100	75-100	50-80	20-45
	34-60	Clay, silty clay, silty clay loam.	MH, CH	A-7	0	100	100	95-100	95-100	50-80	20-45
HwC3*, HwD3*:											
Hudson-------	0-7	Silty clay loam.	ML, CL-ML, OL, CL	A-4, A-6, A-7	0	95-100	95-100	85-100	65-95	25-48	5-19
	7-30	Silty clay, silty clay loam.	CL, CH	A-7, A-6	0	95-100	90-100	80-100	80-100	35-65	15-35
	30-60	Silty clay, silt loam, clay.	CL, CH	A-7, A-6	0	95-100	90-100	80-100	60-100	35-65	15-35
Vergennes----	0-6	Silty clay loam.	MH, CH	A-7	0	100	100	90-100	85-100	40-80	20-40
	6-34	Clay----------	MH, CH	A-7	0	100	100	95-100	75-100	50-80	20-45
	34-60	Clay, silty clay, silty clay loam.	MH, CH	A-7	0	100	100	95-100	95-100	50-80	20-45
KrA*, KrB*:											
Kingsbury----	0-9	Clay loam, silty clay loam.	ML, MH	A-7	0	100	100	90-100	80-95	40-55	11-20
	9-36	Clay----------	MH, CH	A-7	0	100	100	90-100	90-100	50-65	21-35
	36-70	Clay, silty clay, silty clay loam.	MH, CH	A-7	0	100	100	90-100	90-100	50-65	21-35
Rhinebeck----	0-11	Silt loam, silty clay loam.	ML, MH, CL, CH	A-6, A-7	0	80-100	75-100	70-100	60-90	30-55	10-25
	11-32	Silty clay loam, silty clay.	CH, CL	A-7, A-6	0	90-100	85-100	80-100	70-100	30-55	15-30
	32-60	Silty clay loam, silty clay, clay.	CH, CL	A-7, A-6	0	90-100	85-100	80-100	70-100	30-55	15-30

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
LaB, LaC, LaD, LaE---------- Lackawanna	0-3	Channery loam	GM, ML, CL, SM	A-2, A-4	0-15	40-80	40-75	35-70	20-60	---	---
	3-30	Channery loam, silt loam, channery silt loam.	GM, ML, CL, SM	A-2, A-4, A-6, A-1	0-20	40-80	40-75	35-70	20-60	20-35	1-14
	30-60	Silt loam, channery silt loam, channery sandy loam.	GM, SM, ML, CL	A-2, A-4, A-6, A-1	0-20	50-85	40-80	35-75	20-55	15-35	1-12
LcC*, LcD*: Lackawanna---	0-3	Channery loam	ML, CL, GM, SM	A-4, A-2	3-20	40-100	40-95	35-90	20-85	---	---
	3-30	Channery loam, silt loam, flaggy loam.	GM, ML, CL, SM	A-2, A-4, A-6	0-20	40-80	40-75	35-70	20-60	20-35	1-14
	30-60	Channery loam, channery silt loam, flaggy loam.	GM, SM, ML, CL	A-2, A-4, A-6	0-20	50-85	40-80	35-75	20-55	15-35	1-12
Wellsboro----	0-8	Channery loam	ML, CL, SM	A-4, A-2	3-10	70-100	65-100	60-95	30-90	---	---
	8-20	Loam, channery silt loam, gravelly loam.	ML, SM, CL-ML, GM-GC	A-2, A-4	0-15	70-100	60-100	55-95	30-70	15-30	NP-10
	20-60	Loam, channery silt loam, channery loam.	GM, ML, CL, SM	A-2, A-4	0-20	55-90	45-90	35-80	25-60	15-30	NP-10
LeB, LeC, LeD, LeE----------- Lewbeach	0-6	Channery silt loam.	GM, ML, SM	A-4, A-2	0-5	55-80	50-75	35-75	20-70	<25	NP-5
	6-18	Channery loam, channery fine sandy loam, gravelly sandy loam.	GM, ML, SM	A-4, A-2	0-5	55-80	50-75	30-75	15-60	<25	NP-5
	18-60	Gravelly sandy loam, gravelly fine sandy loam, channery loam.	ML, GW-GM, SM	A-1, A-2, A-4	2-10	35-80	30-75	20-70	10-60	<25	NP-5
LfF, LgF------ Lewbeach	0-6	Channery silt loam.	ML, SM, GM	A-4, A-2	5-20	55-80	45-75	30-75	20-65	<25	NP-5
	6-18	Gravelly loam, channery fine sandy loam, gravelly loam.	GM, ML, SM	A-4, A-2	0-5	55-80	50-75	30-75	15-60	<25	NP-5
	18-60	Gravelly sandy loam, gravelly fine sandy loam, gravelly loam.	ML, GW-GM, SM	A-1, A-2, A-4	2-10	35-80	30-75	20-40	10-60	<25	NP-5

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
LlC*, LlD*:											
Lewbeach-----	0-6	Channery silt loam.	ML, SM, GM	A-4, A-2	5-20	55-80	45-75	30-75	20-65	<25	NP-5
	6-18	Gravelly loam, channery fine sandy loam, gravelly loam.	GM, ML, SM	A-4, A-2	0-5	55-80	50-75	30-75	15-60	<25	NP-5
	18-60	Gravelly sandy loam, gravelly fine sandy loam, gravelly loam.	ML, GW-GM, SM	A-1, A-2, A-4	2-10	35-80	30-75	20-40	10-60	<25	NP-5
Willowemoc---	0-6	Channery silt loam.	ML, SM, GM	A-4, A-2	5-20	50-80	45-75	30-75	20-70	<25	NP-5
	6-21	Silt loam, channery loam, gravelly fine sandy loam.	ML, SM, GM	A-4, A-2	0-5	55-95	50-90	35-90	20-80	<25	NP-5
	21-60	Gravelly sandy loam, gravelly fine sandy loam, channery loam.	ML, SM, GM	A-4, A-2	3-15	50-90	45-85	30-85	20-75	<25	NP-5
LmC*, LmD*:											
Lewbeach-----	0-6	Channery silt loam.	ML, SM, GM	A-4, A-2	5-20	55-80	45-75	30-75	20-65	<25	NP-5
	6-18	Gravelly loam, channery fine sandy loam, gravelly loam.	GM, ML, SM	A-4, A-2	0-5	55-80	50-75	30-75	15-60	<25	NP-5
	18-60	Gravelly sandy loam, gravelly fine sandy loam, gravelly loam.	ML, GW-GM, SM	A-1, A-2, A-4	2-10	35-80	30-75	20-40	10-60	<25	NP-5
Willowemoc---	0-6	Channery loam	ML, SM, GM	A-4, A-2	5-20	50-80	45-75	30-75	20-70	<25	NP-5
	6-21	Silt loam, channery loam, gravelly fine sandy loam.	ML, SM, GM	A-4, A-2	0-5	55-95	50-90	35-90	20-80	<25	NP-5
	21-60	Gravelly sandy loam, gravelly fine sandy loam, channery loam.	ML, SM, GM	A-4, A-2	3-15	50-90	45-85	30-85	20-75	<25	NP-5

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
LoA, LoB, LoC, LoD---------- Lordstown	0-5	Channery silt loam.	ML, GM, SM	A-4	5-20	65-85	50-75	45-70	40-65	<30	NP-4
	5-26	Channery silt loam, channery loam.	ML, GM, SM	A-4	5-10	65-85	50-75	45-70	40-65	<30	NP-4
	26	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Lv------------ Lyons	0-9	Silt loam-----	ML, SM	A-7, A-2, A-4	0	80-100	75-100	50-95	30-90	35-45	5-15
	9-24	Silt loam, gravelly loam, silty clay loam.	CL, GC, CL-ML, GM-GC	A-4, A-6, A-2	0-5	60-95	55-90	45-85	25-80	20-35	5-15
	24-61	Gravelly loam, silt loam, very gravelly fine sandy loam.	CL, GC, SC, GM-GC	A-2, A-4, A-6, A-1	5-10	35-95	30-90	25-85	15-80	20-35	5-15
Ly------------ Lyons	0-9	Silt loam-----	ML, OL, SM, GM	A-7, A-2, A-4	5-10	60-75	55-70	50-65	30-60	35-45	5-15
	9-24	Fine sandy loam, gravelly loam, silty clay loam.	CL, GC, CL-ML, GM-GC	A-4, A-6, A-2	0-5	60-95	55-90	45-85	25-80	20-35	5-15
	24-61	Gravelly loam, silt loam, very gravelly fine sandy loam.	CL, GC, SC, GM-GC	A-2, A-4, A-6, A-1	5-10	35-95	30-90	25-85	15-80	20-35	5-15
MaB, MaC, MaD, MaE---------- Maplecrest	0-8	Gravelly silt loam.	ML, GM, GM-GC	A-2, A-4, A-6	0-5	55-80	50-75	40-75	30-70	20-40	1-12
	8-30	Gravelly loam, gravelly silt loam, silt loam.	ML, GM, GM-GC	A-2, A-4	0-10	55-95	50-90	40-90	30-80	15-25	1-7
	30-50	Gravelly loam, gravelly silt loam.	ML, GM, GM-GC	A-2, A-4	0-10	55-75	50-70	40-70	30-65	15-25	1-7
	50-65	Very gravelly sandy loam, very gravelly loam, gravelly sandy loam.	SM, GM, GM-GC	A-1, A-2, A-4	0-15	20-65	15-60	10-55	5-45	15-25	NP-7

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments >3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
MdB, MdC, MdD-- Mardin	0-9	Gravelly silt loam.	GM, ML, CL, GC	A-4	0-5	60-80	55-75	45-75	35-70	25-35	5-10
	9-21	Gravelly silt loam, loam, gravelly loam.	CL, GC, CL-ML, SM-SC	A-4	5-10	60-90	55-90	45-90	35-80	15-25	5-10
	21-60	Gravelly loam, channery silt loam, very channery loam.	CL, GC, SC, CL-ML	A-2, A-4, A-1	10-25	40-80	35-75	30-70	20-65	20-30	5-10
MeC----------- Mardin	0-9	Gravelly silt loam.	GM, ML, CL, GC	A-4	5-10	65-75	60-70	50-70	35-60	25-35	5-10
	9-21	Channery silt loam, loam, gravelly loam.	CL, GC, SC, CL-ML	A-4	5-10	60-90	55-90	45-90	35-80	15-25	5-10
	21-60	Channery loam, channery silt loam, very channery loam.	CL, GC, SC, CL-ML	A-2, A-4, A-1	10-25	40-80	35-75	30-70	20-65	20-30	5-10
Mf*. Medisaprists											
Mh*: Medisaprists.											
Hydraquents.											
Mk------------ Middlebury	0-7	Silt loam-----	ML, SM, SM-SC, CL-ML	A-4, A-2	0	80-100	75-100	50-100	30-90	25-35	5-10
	7-44	Silt loam, very fine sandy loam, fine sandy loam.	ML, SM, SM-SC, CL-ML	A-4, A-2	0	75-100	70-100	50-100	30-85	20-25	2-5
	44-60	Stratified gravelly sandy loam to sand.	GW, GM, SW, SM	A-1, A-2, A-3	0-5	40-100	35-100	20-100	0-35	---	NP
MoA, MoB, MoC-- Morris	0-20	Channery silt loam.	GM, ML, CL, SM	A-4, A-2	0-15	60-95	50-75	40-75	30-65	20-30	1-10
	20-60	Channery silt loam, channery loam, channery silty clay loam.	GM, SM, CL, SM	A-2, A-4	0-20	60-95	45-80	40-80	25-75	15-25	NP-9

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification Unified	Classification AASHTO	Frag- ments >3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
MpC----------- Morris	0-20	Channery silt loam.	GM, ML, CL, SM	A-4, A-2	3-20	60-95	55-85	40-80	30-70	20-30	1-10
	20-60	Channery loam, channery silt loam, channery silty clay loam.	GM, ML, CL, SM	A-2, A-4	0-20	60-95	45-80	40-80	25-75	15-25	NP-9
NaC, NrC, NrD, NrE---------- Nassau	0-3	Channery silt loam.	ML, GM, SM	A-2, A-4	5-20	55-85	45-80	30-75	25-70	25-37	1-10
	3-18	Very channery silt loam, very channery loam, extremely channery silt loam.	GM, GM-GC	A-2, A-4, A-1	10-25	30-60	25-55	20-55	15-50	20-35	1-10
	18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
NuB, NuC, NuD, NuE---------- Nunda	0-15	Silt loam-----	ML, SM	A-4, A-7	0	80-100	75-100	55-100	30-85	35-45	5-15
	15-28	Gravelly silty clay loam, clay loam, silty clay loam.	GM-GC, GC, CL-ML, CL	A-4, A-6, A-2	5-10	65-95	60-90	55-90	45-85	20-30	5-15
	28-65	Gravelly loam, gravelly silty clay loam, silt loam.	GM-GC, GC, CL-ML, CL	A-4, A-6, A-2	5-10	65-95	60-90	55-90	45-85	20-30	5-15
NvC, NvE------ Nunda	0-15	Silt loam-----	ML, SM	A-4, A-7	5-10	80-100	25-100	55-100	30-85	35-45	5-15
	15-28	Gravelly silty clay loam, clay loam, silty clay loam.	GM-GC, GC, CL-ML, CL	A-4, A-6, A-2	5-10	65-95	60-90	55-90	45-85	20-30	5-15
	28-65	Gravelly loam, gravelly silty clay loam, silt loam.	GM-GC, GC, CL-ML, CL	A-4, A-6, A-2	5-10	65-95	60-90	55-90	45-85	20-30	5-15
Oc*. Ochrepts											

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments >3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
OnB, OnC------ Onteora	0-9	Silt loam-----	ML, SM, CL-ML	A-4	0-5	80-95	75-90	60-85	35-75	<25	NP-5
	9-14	Gravelly loam, channery silt loam, sandy loam.	ML, GM, SM, CL-ML	A-1, A-2, A-4	0-5	55-80	50-75	35-70	20-60	<25	NP-5
	14-43	Gravelly silt loam, channery loam, very channery sandy loam.	ML, GM, SM	A-1, A-2, A-4	5-15	45-80	40-75	25-70	15-60	<25	NP-5
	43-60	Gravelly silt loam, channery loam, very gravelly loam.	ML, GM, SM	A-1, A-2, A-4	5-15	45-80	40-75	25-70	15-60	<25	NP-5
OoC, OpC------ Onteora	0-9	Silt loam-----	ML, GM, SM	A-2, A-4	5-20	50-75	45-70	40-65	30-60	<25	NP-5
	9-14	Gravelly loam, channery silt loam, sandy loam.	ML, GM, SM, CL-ML	A-1, A-2, A-4	0-5	55-80	50-75	35-70	20-60	<25	NP-5
	14-43	Gravelly silt loam, channery loam, very channery sandy loam.	ML, GM, SM	A-1, A-2, A-4	5-15	45-80	40-75	25-70	15-60	<25	NP-5
	43-60	Gravelly silt loam, channery loam, very gravelly loam.	ML, GM, SM	A-1, A-2, A-4	5-15	45-80	40-75	25-70	15-60	<25	NP-5
OrB, OrC, OrD- Oquaga	0-8	Very channery silt loam.	GM, ML, SM	A-1, A-2, A-4, A-5	10-25	35-70	25-60	20-60	15-55	35-45	2-7
	8-22	Very channery loam, very channery silt loam.	GM, ML, SM, GM-GC	A-1, A-2, A-4	10-25	35-70	25-60	20-60	15-55	20-30	2-7
	22	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
OsC*, OsD*, OsF*:											
Oquaga------	0-8	Very channery silt loam.	GM, ML, SM	A-1, A-2, A-4, A-5	10-25	35-70	25-60	20-60	15-55	35-45	2-7
	8-22	Very channery loam, very channery silt loam.	GM, ML, SM, GM-GC	A-1, A-2, A-4	10-25	35-70	25-60	20-60	15-55	20-30	2-7
	22	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments >3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
OsC*, OsD*, OsF*:											
Arnot-------	0-1	Channery silt loam.	ML, GM, SM	A-2, A-4, A-5	5-10	60-85	55-80	45-80	30-70	35-45	1-9
	1-12	Very channery silt loam, very channery loam.	GM	A-2, A-4, A-1	10-25	30-60	25-55	20-55	15-50	20-35	1-9
	12	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Pg*, Pr*. Pits											
RhA, RhB, RhC, RhD---------- Riverhead	0-8	Loam----------	SM, ML	A-2, A-4	0-5	95-100	90-100	55-95	30-75	14-18	1-3
	8-24	Sandy loam, fine sandy loam, gravelly sandy loam.	SM, GM	A-2, A-4, A-1	0-5	65-100	60-95	40-80	20-45	14-18	1-3
	24-60	Sand, loamy sand, gravel.	SP, SW, SP-SM, GP	A-1	0-10	40-95	35-90	25-50	0-10	---	NP
Sh------------ Shaker	0-8	Very fine sandy loam.	SM, ML	A-2, A-4	0	100	95-100	60-95	30-60	---	NP
	8-20	Fine sandy loam, sandy loam, loam.	SM, ML	A-2, A-4	0	100	95-100	60-95	30-60	---	NP
	20-60	Silty clay, silty clay loam, clay.	CL, CL-ML	A-6, A-7	0	100	95-100	90-100	75-95	25-50	5-25
Su------------ Suny	0-8	Gravelly silt loam.	GM, ML, SM	A-2, A-4	2-10	55-80	50-75	30-70	15-65	<20	NP-5
	8-19	Gravelly loam, loam, gravelly sandy loam.	ML, SM, GM	A-1, A-2, A-4	0-5	55-90	50-70	20-65	15-60	<20	NP-5
	19-63	Gravelly silt loam, gravelly loam, gravelly sandy loam.	ML, SM, GM	A-1, A-2, A-4	0-5	55-85	50-70	20-65	15-60	<20	NP-5
Ta------------ Tioga	0-10	Loam----------	ML, SM	A-4	0	100	95-100	65-95	40-85	<15	NP-4
	10-34	Silt loam, loam, fine sandy loam.	SM, GM, ML	A-1, A-2, A-4	0	55-100	50-100	35-90	20-80	<15	NP-2
	34-60	Fine sandy loam, gravelly sandy loam, loamy fine sand.	GW-GM, GM, SM, ML	A-1, A-2, A-4, A-3	0-10	35-100	30-100	15-90	5-80	<15	NP-2

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments >3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
To------------ Tor	0-5	Flaggy loam---	GC, SC, CL	A-2, A-4, A-6	5-10	55-75	50-70	40-70	30-60	25-40	5-15
	5-19	Very flaggy loam, very flaggy silt loam, very flaggy fine sandy loam.	GM, GM-GC	A-2, A-4, A-1-b	10-20	40-55	35-50	30-50	20-40	20-30	2-7
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Tr------------ Tor	0-5	Flaggy loam---	GC, SC, CL	A-2, A-4, A-6	10-25	55-75	50-70	40-70	30-60	25-40	5-15
	5-19	Very flaggy loam, very flaggy silt loam.	GM, GM-GC	A-2, A-4, A-1-b	10-20	40-55	35-50	30-50	20-40	20-30	2-7
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Ts------------ Tuller	0-9	Channery silt loam.	ML, GM, SM, MH	A-2, A-7	5-10	55-75	50-70	40-70	30-60	40-55	10-20
	9-14	Channery silt loam, channery loam, fine sandy loam.	GM, GM-GC, SM	A-2, A-4, A-1	10-20	55-70	50-65	30-60	20-50	20-30	2-7
	14	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Tt------------ Tuller	0-9	Channery silt loam.	GM, SM, ML, MH	A-2, A-7	10-25	55-75	50-70	40-70	30-60	40-55	10-20
	9-14	Channery silt loam, channery loam.	GM, GM-GC, SM, SM-SC	A-2, A-1	10-20	55-70	50-65	30-65	20-40	20-30	2-7
	14	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
TuA, TuB, TuC, TuD---------- Tunkhannock	0-7	Gravelly loam	SM, GM, SP, GP	A-1, A-2, A-4	0-20	50-90	30-70	25-60	10-45	---	---
	7-25	Gravelly silt loam, cobbly loam, very gravelly loam.	SM, GM, SP-SM, GP-GM	A-2, A-1, A-4	0-35	40-80	25-75	20-60	10-45	<25	NP-3
	25-60	Gravelly sandy loam, very gravelly loamy sand, extremely gravelly sand.	SM, GM, GP-GM, SP-SM	A-1, A-2, A-3	5-35	30-80	25-70	15-55	5-15	<20	NP-2

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
TvB----------- Tunkhannock	0-7	Gravelly loam	SM, GM, SP, GP	A-1, A-2, A-4	0-20	50-90	30-70	25-60	10-45	---	---
	7-25	Gravelly silt loam, cobbly loam, very gravelly loam.	SM, GM, GP-GM	A-2, A-1, A-4	0-35	40-80	25-65	20-60	10-45	<25	NP-3
	25-60	Gravelly sandy loam, very gravelly loamy sand, extremely gravelly sand.	SM, GM, SP-SM	A-1, A-2, A-3	5-35	30-80	25-70	15-55	5-15	<20	NP-2
TwE*: Tunkhannock--	0-7	Gravelly loam	SM, GM, SP, GP	A-1, A-2, A-4	0-20	50-90	30-70	25-60	10-45	---	---
	7-25	Gravelly silt loam, cobbly loam, very gravelly loam.	SM, GM, SP-SM, GP-GM	A-2, A-1, A-4	0-35	40-80	25-75	20-60	10-45	<25	NP-3
	25-60	Gravelly sandy loam, very gravelly loamy sand, extremely gravelly sand.	SM, GM, GP-GM, SP-SM	A-1, A-2, A-3	5-35	30-80	25-70	15-55	5-15	<20	NP-2
Chenango-----	0-4	Gravelly loam	ML, SM, GM	A-2, A-4, A-1	5-15	55-85	55-80	35-80	15-70	<35	NP-10
	4-26	Gravelly loam, gravelly fine sandy loam, very gravelly loam.	ML, GM, SM	A-2, A-4, A-1	5-10	35-80	30-75	25-75	15-65	<40	NP-10
	26-60	Very gravelly loamy sand, very gravelly sand, gravelly loamy fine sand.	GW, GM, SM, GP	A-1	5-10	25-65	20-60	10-50	1-20	---	NP
Ud*. Udipsamments											
Ur*. Udorthents											

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
VaB, VaC, VaD, VaF---------- Valois	0-8	Gravelly loam	ML, GM, SM, GM-GC	A-4, A-2, A-1	0-5	55-80	50-75	35-75	20-70	20-40	1-12
	8-34	Gravelly loam, gravelly silt loam, gravelly sandy loam.	GM, ML, SM, GM-GC	A-4, A-2, A-1	0-10	55-95	50-90	35-90	20-80	15-25	NP-5
	34-60	Gravelly silt loam, gravelly loam, gravelly sandy loam.	GM, GM-GC, SM, ML	A-4, A-2, A-1	0-10	55-75	50-70	30-70	15-65	15-25	NP-5
VbE, VbF------ Valois	0-8	Very stony loam.	ML, SM, GM, GM-GC	A-4, A-2, A-1	5-10	55-80	50-75	35-75	20-70	20-40	1-12
	8-34	Gravelly loam, gravelly silt loam, gravelly sandy loam.	GM, ML, SM, GM-GC	A-4, A-2, A-1	0-10	55-95	50-90	35-90	20-80	15-25	NP-5
	34-60	Gravelly silt loam, gravelly loam, gravelly sandy loam.	GM, GM-GC, SM, ML	A-4, A-2, A-1	0-10	55-75	50-70	30-70	15-65	15-25	NP-5
VdB*, VdD*: Valois-------	0-8	Gravelly loam	ML, GM, SM, GM-GC	A-4, A-2, A-1	0-5	55-80	50-75	35-75	20-70	20-40	1-12
	8-34	Gravelly loam, gravelly silt loam, gravelly sandy loam.	GM, ML, SM, GM-GC	A-4, A-2, A-1	0-10	55-95	50-90	35-90	20-80	15-25	NP-5
	34-60	Gravelly silt loam, gravelly loam, gravelly sandy loam.	GM, GM-GC, SM, ML	A-4, A-2, A-1	0-10	55-75	50-70	30-70	15-65	15-25	NP-5
Nassau-------	0-3	Channery silt loam.	ML, GM, SM	A-2, A-4	5-20	55-85	45-80	30-75	25-70	25-37	1-10
	3-18	Very channery silt loam, extremely channery silt loam.	GM, GM-GC	A-2, A-4, A-1	10-25	30-60	25-55	20-55	15-50	20-35	1-10
	18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
VeB, VeC, VeD-Vly	0-2	Very channery silt loam.	GM, ML, SM	A-2, A-4	10-25	30-70	25-60	20-60	15-55	35-45	1-9
	2-28	Extremely channery loam, very channery silt loam, very gravelly loam.	GM, ML, SM, GM-GC	A-1, A-2, A-4	10-25	30-70	25-60	20-60	15-55	20-30	1-9
	28	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
VhC*, VhD*, VhF*:											
Vly----------	0-2	Very channery silt loam.	GM, ML, SM	A-2, A-4	10-25	30-70	25-60	20-60	15-55	35-45	1-9
	2-28	Extremely channery loam, very channery silt loam, very gravelly loam.	GM, ML, SM, GM-GC	A-1, A-2, A-4	10-25	30-70	25-60	20-60	15-55	20-30	1-9
	28	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Halcott-----	0-5	Channery silt loam.	ML, SM, GM	A-2, A-4, A-5	5-10	60-85	55-80	40-80	20-70	35-45	1-9
	5-13	Very channery silt loam, extremely channery silt loam, very channery fine sandy loam.	GM, GP-GM	A-2, A-4, A-5	5-20	30-60	20-55	15-55	10-50	35-45	1-9
	13	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
VoA, VoB, VoC-Volusia	0-7	Channery loam	GC, SC, CL, CL-ML	A-4	5-10	70-85	65-80	55-80	40-70	15-25	5-10
	7-12	Channery silt loam, channery loam, silt loam.	CL-ML, CL, GM-GC, SC	A-4	5-10	65-90	60-85	50-85	35-75	15-25	5-10
	12-60	Channery silt loam, channery loam, silty clay loam.	SM-SC, CL, SC, CL-ML	A-4	10-25	75-90	70-85	60-85	40-80	20-30	5-10

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
VpC----------- Volusia	0-7	Channery silt loam.	GC, SC, CL-ML	A-4	5-10	65-85	60-80	50-80	35-70	15-25	5-10
	7-12	Channery silt loam, channery loam, silt loam.	CL-ML, CL, GM-GC, SC	A-4	5-10	65-90	60-85	50-85	35-75	15-25	5-10
	12-60	Channery silt loam, channery loam, silty clay loam.	SM-SC, CL-ML, CL, SC	A-4	10-25	75-90	70-85	60-85	40-80	20-30	5-10
Wa------------ Wayland	0-9	Silt loam-----	ML, OL	A-7, A-5	0	100	95-100	90-100	70-95	40-50	5-15
	9-49	Silt loam, silty clay loam.	ML, CL-ML, CL	A-6, A-4, A-7	0	100	95-100	90-100	70-95	25-45	5-15
	49-60	Stratified silt loam to gravelly fine sandy loam.	CL, CL-ML, SC, GC	A-2, A-4	0	65-100	55-100	50-95	25-90	15-25	5-10
WeB, WeC, WeD- Wellsboro	0-8	Channery loam	ML, CL, SM	A-2, A-4	0-15	70-90	65-85	60-80	30-60	---	---
	8-20	Loam, channery silt loam, gravelly loam.	ML, SM, CL-ML, GM-GC	A-2, A-4	0-15	70-100	60-100	55-95	30-70	15-30	NP-10
	20-60	Loam, channery sandy loam, channery silt loam.	SM, GM, ML, CL	A-2, A-4	0-20	55-90	45-90	35-80	25-60	15-30	NP-10
WmB, WmC, WmD- Willowemoc	0-6	Channery silt loam.	ML, SM, GM	A-4, A-2	3-15	55-80	50-75	35-75	20-70	<25	NP-5
	6-21	Silt loam, channery loam, gravelly fine sandy loam.	ML, SM, GM	A-4, A-2	0-5	55-95	50-90	35-90	20-80	<25	NP-5
	21-60	Gravelly sandy loam, gravelly fine sandy loam, channery loam.	ML, SM, GM	A-1, A-2, A-4	5-10	35-80	30-75	20-70	10-60	<25	NP-5

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
Ad---------------- Alden	0-9	15-27	1.10-1.40	0.6-2.0	0.16-0.22	5.1-7.3	Low-----------	0.37	5	4-10
	9-35	18-35	1.20-1.50	0.2-0.6	0.14-0.20	5.6-7.3	Low-----------	0.37		
	35-60	18-35	1.50-1.80	0.06-0.6	0.08-0.15	6.1-8.4	Low-----------	0.28		
Am---------------- Alden	0-9	15-27	1.10-1.40	0.6-2.0	0.16-0.22	5.1-7.3	Low-----------	0.28	5	4-10
	9-35	18-35	1.20-1.50	0.2-0.6	0.14-0.20	5.6-7.3	Low-----------	0.37		
	35-60	18-35	1.50-1.80	0.06-0.6	0.08-0.15	6.1-8.4	Low-----------	0.28		
ArA, ArB, ArC---- Arnot	0-1	8-18	1.10-1.40	0.6-2.0	0.10-0.15	3.6-6.0	Low-----------	0.24	2	3-6
	1-12	8-18	1.20-1.50	0.6-2.0	0.08-0.12	3.6-6.0	Low-----------	0.17		
	12	---	---	---	---	---	-------------	----		
AsC*, AsD*, AsE*, AuC*, AvD*, AvF*:										
Arnot-----------	0-1	8-18	1.10-1.40	0.6-2.0	0.10-0.15	3.6-6.0	Low-----------	0.24	2	3-6
	1-12	8-18	1.20-1.50	0.6-2.0	0.08-0.12	3.6-6.0	Low-----------	0.17		
	12	---	---	---	---	---	-------------	----		
Lordstown------	0-5	8-18	1.10-1.40	0.6-2.0	0.11-0.17	4.5-6.5	Low-----------	0.20	3	2-6
	5-21	8-18	1.20-1.50	0.6-2.0	0.10-0.16	4.5-6.0	Low-----------	0.28		
	21-26	5-18	1.20-1.50	0.6-2.0	0.05-0.14	5.1-6.0	Low-----------	0.28		
	26	---	---	---	---	---	-------------	----		
AwC*, AwD*, AwE*:										
Arnot-----------	0-1	8-18	1.10-1.40	0.6-2.0	0.10-0.15	3.6-6.0	Low-----------	0.24	2	3-6
	1-12	8-18	1.20-1.50	0.6-2.0	0.08-0.12	3.6-6.0	Low-----------	0.17		
	12	---	---	---	---	---	-------------	----		
Oquaga-----------	0-8	7-27	1.10-1.40	0.6-2.0	0.05-0.13	3.6-6.0	Low-----------	0.20	3	2-6
	8-22	7-27	1.20-1.50	0.6-2.0	0.04-0.12	3.6-6.0	Low-----------	0.20		
	22	---	---	---	---	---	-------------	----		
Ba---------------- Barbour	0-9	6-18	1.15-1.40	0.6-2.0	0.16-0.21	4.5-6.0	Low-----------	0.32	5	1-5
	9-28	6-18	1.15-1.45	2.0-6.0	0.10-0.19	4.5-6.0	Low-----------	0.32		
	28-78	1-8	1.25-1.55	6.0-20	0.02-0.07	4.5-6.5	Low-----------	0.17		
Bs---------------- Basher	0-8	6-18	1.15-1.40	0.6-2.0	0.15-0.21	3.6-6.0	Low-----------	0.32	5	1-5
	8-22	6-18	1.15-1.45	0.6-2.0	0.10-0.19	3.6-6.0	Low-----------	0.32		
	22-43	6-18	1.25-1.55	0.2-2.0	0.10-0.19	4.5-6.5	Low-----------	0.32		
	43-60	1-18	1.25-1.55	0.6-6.0	0.02-0.07	4.5-6.5	Low-----------	0.17		
BuA, BuB, BuC, BvC-------------- Burdett	0-9	15-28	1.20-1.50	0.6-2.0	0.13-0.16	5.1-7.3	Low-----------	0.28	3	3-6
	9-20	15-28	1.20-1.50	0.6-2.0	0.13-0.18	5.1-7.3	Low-----------	0.37		
	20-36	28-35	1.60-1.85	0.06-0.2	0.08-0.14	5.1-7.3	Low-----------	0.28		
	36-60	28-35	1.60-1.85	0.06-0.2	0.08-0.14	6.1-8.4	Low-----------	0.28		
BwB--------------- Busti	0-8	6-18	1.10-1.40	0.2-2.0	0.13-0.20	5.6-6.5	Low-----------	0.32	3	2-6
	8-26	6-18	1.20-1.50	0.2-2.0	0.08-0.15	5.6-6.5	Low-----------	0.24		
	26-60	6-18	1.40-1.70	0.06-0.6	0.08-0.14	5.6-6.5	Low-----------	0.24		
Ca---------------- Canandaigua	0-7	18-35	1.00-1.25	0.6-2.0	0.20-0.35	5.6-7.8	Low-----------	0.49	5	4-15
	7-40	18-35	1.20-1.40	0.2-0.6	0.19-0.20	6.1-7.8	Low-----------	0.49		
	40-60	18-35	1.15-1.40	0.2-0.6	0.19-0.20	6.6-8.4	Low-----------	0.64		

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
Cc-----------------Carlisle	0-75	---	0.13-0.23	0.2-6.0	0.35-0.45	4.5-7.3	-------------	----	2	>70
ChB, ChC----------Chautauqua	0-8	6-18	1.10-1.40	0.6-2.0	0.13-0.20	5.6-6.5	Low----------	0.32	3	2-6
	8-35	6-18	1.20-1.50	0.6-2.0	0.08-0.15	5.6-6.5	Low----------	0.24		
	35-60	6-18	1.40-1.70	0.2-0.6	0.08-0.14	5.6-6.5	Low----------	0.24		
CnA, CnB, CnC-----Chenango	0-4	6-18	1.20-1.50	0.6-6.0	0.08-0.16	4.5-5.5	Low----------	0.24	3	2-6
	4-26	6-18	1.25-1.55	0.6-6.0	0.07-0.15	4.5-6.0	Low----------	0.17		
	26-60	1-8	1.45-1.65	6.0-20	0.01-0.05	5.1-7.8	Low----------	0.17		
Co*:										
Covington--------	0-7	40-90	1.10-1.60	<0.2	0.11-0.14	5.6-7.3	High---------	0.49	3	4-16
	7-28	60-90	1.30-1.40	<0.06	0.09-0.11	5.6-7.8	High---------	0.49		
	28-60	60-90	1.30-1.40	<0.06	0.08-0.10	7.3-8.4	High---------	0.49		
Madalin-----------	0-9	25-27	1.00-1.25	0.2-0.6	0.16-0.21	5.6-7.8	Moderate-----	0.37	5	4-10
	9-30	27-60	1.20-1.40	0.06-0.2	0.12-0.13	5.6-7.8	Moderate-----	0.28		
	30-60	40-60	1.15-1.40	<0.2	0.12-0.13	7.4-8.4	Moderate-----	0.28		
Du*. Dumps										
ElB, ElC, ElD-----Elka	0-8	7-15	1.10-1.40	0.6-2.0	0.11-0.17	4.5-6.0	Low----------	0.24	3	2-6
	8-32	7-15	1.20-1.50	0.6-2.0	0.11-0.17	4.5-6.0	Low----------	0.28		
	32-60	7-15	1.20-1.50	0.6-2.0	0.11-0.17	4.5-6.0	Low----------	0.28		
EmC, EmD, EmF-----Elka	0-8	7-15	1.10-1.40	0.6-2.0	0.11-0.17	4.5-6.0	Low----------	0.24	3	---
	8-32	7-15	1.20-1.50	0.6-2.0	0.11-0.17	4.5-6.0	Low----------	0.28		
	32-60	7-15	1.20-1.50	0.6-2.0	0.11-0.17	4.5-6.0	Low----------	0.28		
EnA, EnB----------Elmridge	0-9	2-8	1.05-1.30	2.0-6.0	0.14-0.24	4.5-6.5	Low----------	0.24	3	2-6
	9-28	2-8	1.35-1.60	2.0-6.0	0.13-0.22	4.5-6.5	Low----------	0.24		
	28-60	35-60	1.55-1.80	<0.2	0.12-0.18	5.6-7.8	Low----------	0.49		
FaC, FaD, FaE-----Farmington	0-8	10-27	1.10-1.40	0.6-2.0	0.08-0.15	5.1-6.5	Low----------	0.24	2	2-6
	8-13	10-27	1.20-1.50	0.6-2.0	0.07-0.18	5.6-7.8	Low----------	0.32		
	13	---	---	---	---	---	-------------	----		
Fu*: Fluvaquents.										
Udifluvents.										
GfB*, GfC*, GfD*:										
Galway-----------	0-9	7-18	1.10-1.40	0.6-2.0	0.09-0.16	5.6-7.3	Low----------	0.24	3	2-6
	9-26	5-18	1.20-1.50	0.6-2.0	0.08-0.19	5.6-7.8	Low----------	0.24		
	26	---	---	---	---	---	-------------	----		
Farmington-------	0-8	10-27	1.10-1.40	0.6-2.0	0.08-0.15	5.1-6.5	Low----------	0.24	2	2-6
	8-13	10-27	1.20-1.50	0.6-2.0	0.07-0.18	5.6-7.8	Low----------	0.32		
	13	---	---	---	---	---	-------------	----		
HaB, HaC----------Halcott	0-5	7-27	1.20-1.40	0.6-2.0	0.10-0.14	3.6-5.5	Low----------	0.24	2	3-6
	5-13	7-27	1.35-1.65	0.6-2.0	0.08-0.12	3.6-5.5	Low----------	0.17		
	13	---	---	---	---	---	-------------	----		

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
HlC*, HlD*, HlE*:										
Halcott----------	0-5	7-27	1.20-1.40	0.6-2.0	0.10-0.14	3.6-5.5	Low-----------	0.24	2	3-6
	5-13	7-27	1.35-1.65	0.6-2.0	0.08-0.12	3.6-5.5	Low-----------	0.17		
	13	---	---	---	---	---	-------------	----		
Vly--------------	0-2	7-27	1.10-1.40	0.6-2.0	0.04-0.12	3.6-5.5	Low-----------	0.20	3	3-6
	2-28	7-27	1.20-1.50	0.6-2.0	0.04-0.12	3.6-5.5	Low-----------	0.20		
	28	---	---	---	---	---	-------------	----		
HvB*, HvC*, HvE*:										
Hudson-----------	0-8	20-27	1.00-1.25	0.2-2.0	0.16-0.21	5.1-7.3	Moderate------	0.49	3	3-6
	8-13	35-60	1.15-1.40	<0.2	0.13-0.17	5.1-7.3	Moderate------	0.28		
	13-30	25-60	1.15-1.40	<0.2	0.13-0.17	5.6-7.8	Moderate------	0.28		
	30-60	35-60	1.15-1.40	<0.2	0.12-0.20	6.6-8.4	Moderate------	0.28		
Vergennes--------	0-17	27-40	1.25-1.55	0.06-0.6	0.11-0.21	5.1-7.3	Moderate------	0.49	3	2-6
	17-34	60-90	1.10-1.40	<0.2	0.09-0.11	5.1-7.3	Moderate------	0.49		
	34-60	60-90	1.10-1.40	<0.2	0.09-0.11	7.3-8.4	Moderate------	0.49		
HwC3*, HwD3*:										
Hudson-----------	0-7	27-40	1.00-1.25	0.2-2.0	0.16-0.21	5.1-7.3	Moderate------	0.49	3	3-6
	7-30	25-60	1.15-1.40	<0.2	0.13-0.17	5.6-7.8	Moderate------	0.28		
	30-60	35-60	1.15-1.40	<0.2	0.12-0.20	6.6-8.4	Moderate------	0.28		
Vergennes--------	0-6	27-40	1.25-1.55	0.06-0.6	0.11-0.21	4.5-7.3	Moderate------	0.49	3	2-6
	6-34	60-90	1.10-1.40	<0.2	0.09-0.11	4.5-7.3	Moderate------	0.49		
	34-60	60-90	1.10-1.40	<0.2	0.09-0.11	5.6-8.4	Moderate------	0.49		
KrA*, KrB*:										
Kingsbury--------	0-9	25-40	1.35-1.55	0.06-0.2	0.22-0.24	5.1-7.3	Moderate------	0.49	3	3-9
	9-36	60-90	1.40-1.75	<0.06	0.12-0.13	5.1-7.8	High----------	0.28		
	36-70	60-90	1.40-1.50	<0.06	0.12-0.14	7.4-8.4	High----------	0.28		
Rhinebeck--------	0-11	15-40	1.00-1.25	0.2-0.6	0.16-0.21	5.1-7.3	Moderate------	0.49	3	3-7
	11-32	35-60	1.20-1.40	0.06-0.2	0.12-0.14	5.1-7.8	Moderate------	0.28		
	32-60	35-60	1.15-1.40	0.06-0.2	0.12-0.14	6.1-8.4	Moderate------	0.28		
LaB, LaC, LaD, LaE-------------- Lackawanna	0-3	10-27	1.20-1.40	0.6-2.0	0.10-0.14	4.5-6.0	Low-----------	0.28	3	1-3
	3-30	5-18	1.40-1.60	0.6-2.0	0.10-0.14	4.5-5.5	Low-----------	0.20		
	30-60	5-18	1.60-1.80	0.06-0.2	0.06-0.12	4.5-6.0	Low-----------	0.20		
LcC*, LcD*:										
Lackawanna-------	0-3	10-27	1.20-1.40	0.6-2.0	0.10-0.16	4.5-6.0	Low-----------	0.24	3	---
	3-30	5-18	1.40-1.60	0.6-2.0	0.10-0.16	4.5-5.5	Low-----------	0.20		
	30-60	5-18	1.60-1.80	0.06-0.2	0.06-0.12	4.5-6.0	Low-----------	0.20		
Wellsboro--------	0-8	15-25	1.20-1.40	0.6-2.0	0.10-0.16	4.5-6.0	Low-----------	0.24	3	---
	8-20	15-27	1.30-1.50	0.6-2.0	0.10-0.14	4.5-6.0	Low-----------	0.28		
	20-60	15-27	1.30-1.60	0.06-0.2	0.06-0.10	4.5-6.0	Low-----------	0.28		
LeB, LeC, LeD, LeE-------------- Lewbeach	0-6	1-18	1.10-1.40	0.6-2.0	0.08-0.16	4.5-5.5	Low-----------	0.24	3	3-10
	6-18	1-18	1.20-1.50	0.2-2.0	0.07-0.14	4.5-5.5	Low-----------	0.24		
	18-60	1-18	1.65-2.00	<0.2	0.03-0.07	4.5-6.5	Low-----------	0.24		
LfF, LgF---------- Lewbeach	0-6	1-18	1.10-1.40	0.6-2.0	0.14-0.18	4.5-5.5	Low-----------	0.20	3	---
	6-18	1-18	1.20-1.50	0.2-2.0	0.07-0.15	4.5-5.5	Low-----------	0.24		
	18-60	1-18	1.65-2.00	<0.2	0.03-0.07	4.5-6.5	Low-----------	0.24		

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
LlC*, LlD*, LmC*, LmD*:										
Lewbeach	0-6	1-18	1.10-1.40	0.6-2.0	0.14-0.18	4.5-5.5	Low	0.20	3	---
	6-18	1-18	1.20-1.50	0.2-2.0	0.07-0.15	4.5-5.5	Low	0.24		
	18-60	1-18	1.65-2.00	<0.2	0.03-0.07	4.5-6.5	Low	0.24		
Willowemoc	0-6	1-18	1.10-1.40	0.6-2.0	0.08-0.19	3.6-5.5	Low	0.20	3	---
	6-21	1-18	1.10-1.40	0.6-2.0	0.08-0.19	3.6-5.5	Low	0.24		
	21-60	1-18	1.20-1.55	<0.2	0.06-0.17	3.6-5.5	Low	0.24		
LoA, LoB, LoC, LoD	0-5	8-18	1.10-1.40	0.6-2.0	0.11-0.17	4.5-6.5	Low	0.20	3	2-6
Lordstown	5-26	8-18	1.20-1.50	0.6-2.0	0.10-0.16	4.5-6.0	Low	0.28		
	26	---	---	---	---	---	-------------	----		
Lv	0-9	15-27	1.10-1.40	0.2-2.0	0.15-0.23	5.6-7.3	Low	0.37	5	3-15
Lyons	9-24	18-28	1.20-1.50	0.2-2.0	0.08-0.18	6.1-7.8	Low	0.37		
	24-61	18-28	1.70-1.95	<0.2	0.06-0.15	7.4-8.4	Low	0.28		
Ly	0-9	15-27	1.10-1.40	0.2-2.0	0.11-0.16	5.6-7.3	Low	0.28	5	---
Lyons	9-24	18-28	1.20-1.50	0.2-2.0	0.08-0.18	6.1-7.8	Low	0.37		
	24-61	18-28	1.70-1.95	<0.2	0.06-0.15	7.4-8.4	Low	0.28		
MaB, MaC, MaD, MaE	0-8	6-18	1.10-1.40	0.6-2.0	0.10-0.17	5.1-6.5	Low	0.24	3	2-6
Maplecrest	8-30	6-18	1.20-1.50	0.6-2.0	0.10-0.19	4.5-6.5	Low	0.24		
	30-50	6-18	1.20-1.50	0.6-2.0	0.10-0.14	4.5-6.5	Low	0.24		
	50-65	4-10	1.40-1.60	0.6-6.0	0.02-0.10	5.1-6.0	Low	0.24		
MdB, MdC, MdD	0-9	10-18	1.10-1.40	0.6-2.0	0.09-0.14	3.6-6.5	Low	0.24	3	3-7
Mardin	9-21	10-18	1.20-1.50	0.6-2.0	0.09-0.16	3.6-6.5	Low	0.24		
	21-60	10-18	1.70-2.00	<0.2	0.01-0.03	4.5-7.3	Low	0.24		
MeC	0-9	10-18	1.10-1.40	0.6-2.0	0.11-0.17	3.6-6.5	Low	0.24	3	3-7
Mardin	9-21	10-18	1.20-1.50	0.6-2.0	0.09-0.16	3.6-6.5	Low	0.24		
	21-60	10-18	1.70-2.00	<0.2	0.01-0.03	4.5-7.3	Low	0.24		
Mf*. Medisaprists										
Mh*:										
Medisaprists.										
Hydraquents.										
Mk	0-7	5-18	1.15-1.40	0.6-2.0	0.14-0.21	5.1-6.5	Low	0.28	5	3-7
Middlebury	7-44	5-18	1.15-1.45	0.6-2.0	0.10-0.20	5.6-7.3	Low	0.28		
	44-60	1-10	1.25-1.55	2.0-20	0.01-0.10	5.6-7.3	Low	0.20		
MoA, MoB, MoC	0-20	15-25	1.20-1.40	0.6-2.0	0.10-0.14	4.5-6.0	Low	0.28	4	1-3
Morris	20-60	15-32	1.30-1.70	<0.2	0.06-0.08	4.5-6.5	Low	0.24		
MpC	0-20	15-25	1.20-1.40	0.6-2.0	0.12-0.16	4.5-6.0	Low	0.24	4	---
Morris	20-60	15-32	1.30-1.70	<0.2	0.06-0.08	4.5-6.5	Low	0.24		
NaC, NrC, NrD, NrE	0-3	1-10	1.10-1.40	0.6-2.0	0.08-0.16	4.5-5.5	Low	0.20	2	3-5
Nassau	3-18	1-10	1.20-1.50	0.6-2.0	0.07-0.12	4.5-5.5	Low	0.20		
	18	---	---	---	---	---	-------------	----		

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
NuB, NuC, NuD, NuE: Nunda	0-15	10-25	1.10-1.40	0.6-2.0	0.15-0.20	5.1-7.3	Low	0.37	3	3-7
	15-28	28-35	1.45-1.65	0.2-0.6	0.08-0.14	5.6-7.3	Low	0.28		
	28-65	20-35	1.55-1.85	<0.2	0.08-0.14	6.1-8.4	Low	0.28		
NvC, NvE: Nunda	0-15	10-25	1.10-1.40	0.6-2.0	0.13-0.16	5.1-7.3	Low	0.28	3	---
	15-28	28-35	1.45-1.65	0.2-0.6	0.08-0.14	5.6-7.3	Low	0.28		
	28-65	20-35	1.55-1.85	<0.2	0.08-0.14	6.1-8.4	Low	0.28		
Oc*. Ochrepts										
OnB, OnC: Onteora	0-9	1-18	1.10-1.40	0.6-2.0	0.13-0.20	4.5-6.5	Low	0.28	3	4-12
	9-14	1-18	1.10-1.40	0.6-2.0	0.07-0.15	4.5-6.5	Low	0.20		
	14-43	1-18	1.70-2.00	<0.2	0.01-0.03	4.5-6.0	Low	0.20		
	43-60	1-18	1.55-1.70	<0.2	0.02-0.04	4.5-6.0	Low	0.20		
OoC: Onteora	0-9	1-18	1.10-1.40	0.6-2.0	0.09-0.17	4.5-6.5	Low	0.20	3	4-12
	9-14	1-18	1.10-1.40	0.6-2.0	0.07-0.15	4.5-6.5	Low	0.20		
	14-43	1-18	1.70-2.00	<0.2	0.01-0.03	4.5-6.0	Low	0.20		
	43-60	1-18	1.55-1.70	<0.2	0.02-0.04	4.5-6.0	Low	0.20		
OpC: Onteora	0-9	1-18	1.10-1.40	0.6-2.0	0.09-0.17	4.5-6.5	Low	0.20	3	4-12
	9-14	1-18	1.10-1.40	0.6-2.0	0.07-0.15	4.5-6.5	Low	0.20		
	14-43	1-18	1.70-2.00	<0.2	0.01-0.03	4.5-6.0	Low	0.20		
	43-60	1-18	1.55-1.70	<0.2	0.02-0.04	4.5-6.0	Low	0.20		
OrB, OrC, OrD: Oquaga	0-8	7-27	1.10-1.40	0.6-2.0	0.05-0.13	3.6-6.0	Low	0.20	3	2-6
	8-22	7-27	1.20-1.50	0.6-2.0	0.04-0.12	3.6-6.0	Low	0.20		
	22	---	---	---	---	---	-------------	----		
OsC*, OsD*, OsF*: Oquaga	0-8	7-27	1.10-1.40	0.6-2.0	0.05-0.13	3.6-6.0	Low	0.20	3	2-6
	8-22	7-27	1.20-1.50	0.6-2.0	0.04-0.12	3.6-6.0	Low	0.20		
	22	---	---	---	---	---	-------------	----		
Arnot	0-1	8-18	1.10-1.40	0.6-2.0	0.10-0.15	3.6-6.0	Low	0.24	2	3-6
	1-12	8-18	1.20-1.50	0.6-2.0	0.08-0.12	3.6-6.0	Low	0.17		
	12	---	---	---	---	---	-------------	----		
Pg*, Pr*. Pits										
RhA, RhB, RhC, RhD: Riverhead	0-8	3-10	1.10-1.40	2.0-6.0	0.14-0.20	4.5-6.0	Low	0.28	3	2-4
	8-24	1-8	1.25-1.55	2.0-6.0	0.09-0.13	4.5-6.0	Low	0.28		
	24-60	1-8	1.45-1.65	>20	0.02-0.04	4.5-6.0	Low	0.17		
Sh: Shaker	0-8	2-8	1.00-1.25	2.0-6.0	0.14-0.24	5.1-6.5	Low	0.24	3	2-10
	8-20	2-8	1.35-1.60	2.0-6.0	0.13-0.22	5.1-6.5	Low	0.24		
	20-60	35-60	1.55-1.80	<0.2	0.12-0.18	5.1-7.3	Low	0.49		
Su: Suny	0-8	1-18	1.10-1.40	0.6-2.0	0.14-0.18	3.6-5.5	Low	0.24	3	4-8
	8-19	1-18	1.20-1.50	0.06-0.2	0.02-0.08	3.6-5.5	Low	0.20		
	19-63	1-18	1.55-1.70	0.06-0.2	0.02-0.08	3.6-5.5	Low	0.20		
Ta: Tioga	0-10	5-18	1.15-1.40	0.6-6.0	0.15-0.21	5.1-7.3	Low	0.37	5	2-6
	10-34	5-18	1.15-1.45	0.6-6.0	0.07-0.20	5.1-7.3	Low	0.28		
	34-60	3-15	1.25-1.55	0.6-20	0.02-0.20	5.6-7.8	Low	0.28		

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
To----------------- Tor	0-5	7-27	1.10-1.40	0.6-2.0	0.09-0.15	3.6-5.5	Low----------	0.24	2	4-9
	5-19	7-27	1.20-1.50	0.06-0.6	0.06-0.10	3.6-5.5	Low----------	0.17		
	19	---	---	---	---	---	-------------	----		
Tr----------------- Tor	0-5	7-27	1.10-1.40	0.6-2.0	0.07-0.11	3.6-5.5	Low----------	0.24	2	---
	5-19	7-27	1.20-1.40	0.06-0.6	0.06-0.10	3.6-5.5	Low----------	0.17		
	19	---	---	---	---	---	-------------	----		
Ts----------------- Tuller	0-9	10-27	1.10-1.40	0.6-2.0	0.09-0.15	4.5-6.0	Low----------	0.24	2	4-9
	9-14	10-27	1.20-1.50	0.06-0.6	0.06-0.10	4.5-6.0	Low----------	0.17		
	14	---	---	---	---	---	-------------	----		
Tt----------------- Tuller	0-9	10-27	1.10-1.40	0.6-2.0	0.07-0.11	4.5-6.0	Low----------	0.24	2	---
	9-14	10-27	1.20-1.40	0.06-0.6	0.06-0.10	4.5-6.0	Low----------	0.17		
	14	---	---	---	---	---	-------------	----		
TuA, TuB, TuC, TuD-------------- Tunkhannock	0-7	10-20	1.20-1.40	2.0-6.0	0.08-0.15	3.6-6.0	Low----------	0.24	3	2-4
	7-25	10-20	1.40-1.60	2.0-6.0	0.08-0.12	3.6-6.0	Low----------	0.17		
	25-60	10-20	1.40-1.60	2.0-20	0.01-0.08	3.6-6.0	Low----------	0.17		
TvB--------------- Tunkhannock	0-7	10-20	1.20-1.40	2.0-6.0	0.08-0.15	3.6-6.0	Low----------	0.24	3	2-4
	7-25	10-20	1.40-1.60	2.0-6.0	0.08-0.12	3.6-6.0	Low----------	0.17		
	25-60	5-15	1.40-1.65	2.0-20	0.01-0.08	3.6-6.0	Low----------	0.17		
TwE*: Tunkhannock-----	0-7	10-20	1.20-1.40	2.0-6.0	0.08-0.15	3.6-6.0	Low----------	0.24	3	2-4
	7-25	10-20	1.40-1.60	2.0-6.0	0.08-0.12	3.6-6.0	Low----------	0.17		
	25-60	10-20	1.40-1.60	2.0-20	0.01-0.08	3.6-6.0	Low----------	0.17		
Chenango---------	0-4	6-18	1.20-1.50	0.6-6.0	0.08-0.16	4.5-5.5	Low----------	0.24	3	2-6
	4-26	6-18	1.25-1.55	0.6-6.0	0.07-0.15	4.5-6.0	Low----------	0.17		
	26-60	1-8	1.45-1.65	6.0-20	0.01-0.05	5.1-7.8	Low----------	0.17		
Ud*. Udipsamments										
Ur*. Udorthents										
VaB, VaC, VaD, VaF-------------- Valois	0-8	6-18	1.10-1.40	0.6-2.0	0.08-0.16	3.6-6.0	Low----------	0.24	3	2-6
	8-34	6-18	1.20-1.50	0.6-2.0	0.07-0.14	3.6-6.0	Low----------	0.24		
	34-60	6-18	1.20-1.50	0.6-6.0	0.07-0.14	4.5-7.3	Low----------	0.24		
VbE, VbF--------- Valois	0-8	6-18	1.10-1.40	0.6-2.0	0.08-0.16	3.6-6.0	Low----------	0.24	3	---
	8-34	6-18	1.20-1.50	0.6-2.0	0.07-0.14	3.6-6.0	Low----------	0.24		
	34-60	6-18	1.20-1.50	0.6-6.0	0.07-0.14	4.5-7.3	Low----------	0.24		
VdB*, VdD*: Valois----------	0-8	6-18	1.10-1.40	0.6-2.0	0.08-0.16	3.6-6.0	Low----------	0.24	3	2-6
	8-34	6-18	1.20-1.50	0.6-2.0	0.07-0.14	3.6-6.0	Low----------	0.24		
	34-60	6-18	1.20-1.50	0.6-6.0	0.07-0.14	4.5-7.3	Low----------	0.24		
Nassau----------	0-3	1-10	1.10-1.40	0.6-2.0	0.08-0.16	4.5-5.5	Low----------	0.20	2	3-5
	3-18	1-10	1.20-1.50	0.6-2.0	0.07-0.12	4.5-5.5	Low----------	0.20		
	18	---	---	---	---	---	-------------	----		
VeB, VeC, VeD---- Vly	0-2	7-27	1.10-1.40	0.6-2.0	0.04-0.12	3.6-5.5	Low----------	0.20	3	3-6
	2-28	7-27	1.20-1.50	0.6-2.0	0.04-0.12	3.6-5.5	Low----------	0.20		
	28	---	---	---	---	---	-------------	----		

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
VhC*, VhD*, VhF*:										
Vly-------------	0-2	7-27	1.10-1.40	0.6-2.0	0.04-0.12	3.6-5.5	Low-----------	0.20	3	3-6
	2-28	7-27	1.20-1.50	0.6-2.0	0.04-0.12	3.6-5.5	Low-----------	0.20		
	28	---	---	---	---	---	-------------	----		
Halcott---------	0-5	7-27	1.20-1.40	0.6-2.0	0.10-0.14	3.6-5.5	Low-----------	0.24	2	3-6
	5-13	7-27	1.35-1.65	0.6-2.0	0.08-0.12	3.6-5.5	Low-----------	0.17		
	13	---	---	---	---	---	-------------	----		
VoA, VoB, VoC---- Volusia	0-7	18-27	1.10-1.40	0.6-2.0	0.11-0.17	4.5-6.5	Low-----------	0.24	3	2-7
	7-12	18-27	1.30-1.60	0.6-2.0	0.09-0.16	4.5-6.5	Low-----------	0.24		
	12-60	15-35	1.70-2.00	<0.2	0.01-0.02	5.1-7.3	Low-----------	0.24		
VpC-------------- Volusia	0-7	18-27	1.10-1.40	0.6-2.0	0.11-0.17	4.5-6.5	Low-----------	0.24	3	---
	7-12	18-27	1.30-1.60	0.6-2.0	0.09-0.16	4.5-6.5	Low-----------	0.24		
	12-60	15-35	1.70-2.00	<0.2	0.01-0.02	5.1-7.3	Low-----------	0.24		
Wa--------------- Wayland	0-9	15-35	1.05-1.40	0.2-2.0	0.17-0.22	5.1-7.8	Low-----------	0.43	5	4-8
	9-49	18-35	1.10-1.60	0.06-0.2	0.16-0.20	5.1-8.4	Low-----------	0.43		
	49-60	15-25	1.25-1.55	0.06-0.2	0.08-0.19	5.6-8.4	Low-----------	0.43		
WeB, WeC, WeD---- Wellsboro	0-8	15-25	1.20-1.40	0.6-2.0	0.10-0.14	4.5-6.0	Low-----------	0.28	3	1-3
	8-20	15-27	1.30-1.50	0.6-2.0	0.10-0.14	4.5-6.0	Low-----------	0.28		
	20-60	15-27	1.30-1.60	0.06-0.2	0.06-0.10	4.5-6.0	Low-----------	0.28		
WmB, WmC, WmD---- Willowemoc	0-6	1-18	1.10-1.40	0.6-2.0	0.08-0.19	3.6-5.5	Low-----------	0.24	3	3-10
	6-21	1-18	1.10-1.40	0.6-2.0	0.08-0.19	3.6-5.5	Low-----------	0.24		
	21-60	1-18	1.65-2.00	<0.2	0.01-0.03	3.6-5.5	Low-----------	0.20		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
Ad, Am: Alden	D	None	---	---	+1-0.5	Apparent	Nov-Jun	>60	---	High	High	Low.
ArA, ArB, ArC: Arnot	C/D	None	---	---	>6.0	---	---	10-20	Hard	Moderate	Low	High.
AsC*, AsD*, AsE*, AuC*, AvD*, AvF*:												
Arnot	C/D	None	---	---	>6.0	---	---	10-20	Hard	Moderate	Low	High.
Lordstown	C	None	---	---	>6.0	---	---	20-40	Hard	Moderate	Low	High.
AwC*, AwD*, AwE*:												
Arnot	C/D	None	---	---	>6.0	---	---	10-20	Hard	Moderate	Low	High.
Oquaga	C	None	---	---	>6.0	---	---	20-40	Hard	Moderate	Low	Moderate.
Ba: Barbour	B	Occasional	Brief	Dec-Apr	3.0-6.0	Apparent	Jan-Apr	>60	---	Moderate	Low	Moderate.
Bs: Basher	B	Occasional	Brief to long.	Dec-Apr	1.5-2.0	Apparent	Jan-May	>60	---	High	Moderate	Moderate.
BuA, BuB, BuC, BvC: Burdett	C	None	---	---	0.5-1.5	Perched	Dec-May	>60	---	High	High	Low.
BwB: Busti	C	None	---	---	0.5-1.5	Perched	Nov-Apr	>60	---	High	High	Low.
Ca: Canandaigua	D	None	---	---	+1-1.0	Apparent	Nov-May	>60	---	High	High	Low.
Cc: Carlisle	A/D	None	---	---	+.5-1.0	Apparent	Sep-Jun	>60	---	High	High	Low.

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
ChB, ChC: Chautauqua	C	None	---	---	1.5-2.0	Perched	Nov-Apr	>60	---	Moderate	Moderate	Moderate.
CnA, CnB, CnC: Chenango	A	None	---	---	>6.0	---	---	>60	---	Moderate	Low	Moderate.
Co*:												
Covington	D	None	---	---	0.5-1.0	Apparent	Oct-May	>60	---	Moderate	High	Moderate.
Madalin	D	None	---	---	0-0.5	Apparent	Nov-Jun	>60	---	High	High	Low.
Du*. Dumps												
ElB, ElC, ElD, EmC, EmD, EmF: Elka	C	None	---	---	>6.0	---	---	>60	---	Moderate	Low	High.
EnA, EnB: Elmridge	C	None	---	---	1.5-3.0	Perched	Nov-May	>60	---	High	Moderate	Moderate.
FaC, FaD, FaE: Farmington	C	None	---	---	>6.0	---	---	10-20	Hard	Moderate	Low	Moderate.
Fu*: Fluvaquents.												
Udifluvents												
GfB*, GfC*, GfD*:												
Galway	B	None	---	---	1.5-3.0	Perched	Mar-Apr	20-40	Hard	Moderate	Low	Low.
Farmington	C	None	---	---	>6.0	---	---	10-20	Hard	Moderate	Low	Moderate.
HaB, HaC: Halcott	C/D	None	---	---	>6.0	---	---	10-20	Hard	Moderate	Low	High.
HlC*, HlD*, HlE*:												
Halcott	C/D	None	---	---	>6.0	---	---	10-20	Hard	Moderate	Low	High.
Vly	C	None	---	---	>6.0	---	---	20-40	Hard	Moderate	Low	Moderate.

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Bedrock: Hardness	Potential frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In				
HvB*, HvC*, HvE*, HwC3*, HwD3*:												
Hudson----------	C	None--------	---	---	1.5-2.0	Perched	Nov-Apr	>60	---	High-----	High-----	Low.
Vergennes-------	C	None--------	---	---	1.0-3.0	Apparent	Dec-May	>60	---	Moderate	High-----	Moderate.
KrA*, KrB*:												
Kingsbury--------	D	None--------	---	---	0.5-1.5	Perched	Dec-May	>60	---	High-----	High-----	Moderate.
Rhinebeck--------	D	None--------	---	---	0.5-1.5	Perched	Jan-May	>60	---	High-----	High-----	Low.
LaB, LaC, LaD, LaE-------------- Lackawanna	C	None--------	---	---	2.0-6.0	Perched	Nov-Mar	>60	---	Moderate	Low------	Moderate.
LcC*, LcD*:												
Lackawanna-------	C	None--------	---	---	2.0-4.0	Perched	Nov-Mar	>60	---	Moderate	Low------	Moderate.
Wellsboro--------	C	None--------	---	---	1.5-3.0	Perched	Nov-Mar	>60	---	High-----	High-----	Moderate.
LeB, LeC, LeD, LeE, LfF, LgF---- Lewbeach	C	None--------	---	---	2.0-4.0	Perched	Mar-May	>60	---	Moderate	Moderate	Moderate.
LlC*, LlD*, LmC*, LmD*:												
Lewbeach--------	C	None--------	---	---	2.0-4.0	Perched	Mar-May	>60	---	Moderate	Moderate	Moderate.
Willowemoc------	C	None--------	---	---	1.5-2.5	Perched	Oct-May	>60	---	High-----	High-----	Moderate.
LoA, LoB, LoC, LoD-------------- Lordstown	C	None--------	---	---	>6.0	---	---	20-40	Hard	Moderate	Low------	High.
Lv, Ly------------ Lyons	D	None--------	---	---	+1-0.5	Apparent	Nov-Jun	>60	---	High-----	High-----	Low.
MaB, MaC, MaD, MaE-------------- Maplecrest	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Low------	High.

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
MdB, MdC, MdD, MeC-------------- Mardin	C	None--------	---	---	1.5-2.0	Perched	Mar-May	>60	---	Moderate	Moderate	Low.
Mf*. Medisaprists												
Mh*: Medisaprists.												
Hydraquents.												
Mk---------------- Middlebury	B	Occasional	Brief-----	Nov-May	0.5-2.0	Apparent	Feb-Apr	>60	---	High-----	Moderate	Low.
MoA, MoB, MoC, MpC ------------- Morris	C	None--------	---	---	0.5-1.5	Perched	Nov-Mar	>60	---	High-----	High-----	Moderate.
NaC, NrC, NrD, NrE-------------- Nassau	C	None--------	---	---	>6.0	---	---	10-20	Hard	Moderate	Low------	High.
NuB, NuC, NuD, NuE, NvC, NvE---- Nunda	C	None--------	---	---	1.5-2.0	Perched	Mar-May	>60	---	High-----	Moderate	Low.
Oc*. Ochrepts												
OnB, OnC, OoC, OpC-------------- Onteora	C	None--------	---	---	0.5-1.5	Perched	Nov-Apr	>60	---	High-----	High-----	Moderate.
OrB, OrC, OrD----- Oquaga	C	None--------	---	---	>6.0	---	---	20-40	Hard	Moderate	Low------	Moderate.
OsC*, OsD*, OsF*: Oquaga-----------	C	None--------	---	---	>6.0	---	---	20-40	Hard	Moderate	Low------	Moderate.
Arnot------------	C/D	None--------	---	---	>6.0	---	---	10-20	Hard	Moderate	Low------	High.

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Bedrock: Hardness	Potential frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In				
Pg*, Pr*. Pits												
RhA, RhB, RhC, RhD----------- Riverhead	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Low------	High.
Sh--------------- Shaker	C	None--------	---	---	0-1.5	Apparent	Nov-May	>60	---	High-----	Moderate	Moderate.
Su--------------- Suny	D	None--------	---	---	0-0.5	Perched	Nov-Apr	>60	---	High-----	High-----	High.
Ta--------------- Tioga	B	Occasional	Brief-----	Nov-May	3.0-6.0	Apparent	Feb-Apr	>60	---	Moderate	Low------	Moderate.
To, Tr----------- Tor	D	None--------	---	---	0.5-1.0	Perched	Dec-Jun	10-20	Hard	High-----	High-----	High.
Ts, Tt----------- Tuller	D	None--------	---	---	0.5-1.0	Perched	Dec-Jun	10-20	Hard	High-----	High-----	High.
TuA, TuB, TuC, TuD----------- Tunkhannock	A	None--------	---	---	>6.0	---	---	>60	---	Low------	Low------	High.
TvB-------------- Tunkhannock	A	Rare--------	---	---	3.0-6.0	Apparent	Apr-May	>60	---	Low------	Low------	High.
TwE*:												
Tunkhannock------	A	None--------	---	---	>6.0	---	---	>60	---	Low------	Low------	High.
Chenango---------	A	None--------	---	---	>6.0	---	---	>60	---	Moderate	Low------	Moderate.
Ud*. Udipsamments												
Ur*. Udorthents												

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Bedrock: Hardness	Potential frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In				
VaB, VaC, VaD, VaF, VbE, VbF: Valois	B	None	---	---	>6.0	---	---	>60	---	Moderate	Low	High.
VdB*, VdD*: Valois	B	None	---	---	>6.0	---	---	>60	---	Moderate	Low	High.
Nassau	C	None	---	---	>6.0	---	---	10-20	Hard	Moderate	Low	High.
VeB, VeC, VeD: Vly	C	None	---	---	>6.0	---	---	20-40	Hard	Moderate	Low	Moderate.
VhC*, VhD*, VhF*: Vly	C	None	---	---	>6.0	---	---	20-40	Hard	Moderate	Low	Moderate.
Halcott	C/D	None	---	---	>6.0	---	---	10-20	Hard	Moderate	Low	High.
VoA, VoB, VoC, VpC: Volusia	C	None	---	---	0.5-1.5	Perched	Dec-May	>60	---	High	High	Moderate.
Wa: Wayland	C/D	Frequent	Brief to long.	Nov-Jun	0-0.5	Apparent	Nov-Jun	>60	---	High	High	Low.
WeB, WeC, WeD: Wellsboro	C	None	---	---	1.5-3.0	Perched	Nov-Mar	>60	---	High	High	Moderate.
WmB, WmC, WmD: Willowemoc	C	None	---	---	1.5-2.5	Perched	Oct-May	>60	---	High	High	Moderate.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 18.--ENGINEERING INDEX TEST DATA

(Dashes indicate that data were not available. LL means liquid limit; PI, plasticity index; MD, maximum dry density; OM, optimum moisture; LS, linear shrinkage; and NP, nonplastic)

Soil name, report number, horizon, and depth in inches	Classification		Grain-size distribution											LL	PI	Moisture density		LS
			>3	Percentage passing sieve--							Percentage smaller than--					MD	OM	
	AASHTO	Unified		2 inch	3/4 inch	3/8 inch	No. 4	No. 10	No. 40	No. 200	.02 mm	.005 mm	.002 mm					
			Pct											Pct		Lb/ cu ft	Pct	Pct
Barbour loam: (S82-NY-39-10)																		
Ap--- 0 to 9	A-4 (0)	ML	---	---	100	99.1	96.6	94.7	89.5	59.5	33.7	30.0	7.4	31.0	25.4	101.3	18.0	3.1
Bw1-- 9 to 15	A-4 (0)	ML	---	---	99.9	99.5	98.4	95.9	90.3	53.5	28.7	13.8	6.5	---	NP	105.4	17.4	2.0
Bw2-- 15 to 23	A-4 (0)	SM	---	---	---	100	99.6	98.6	95.6	49.3	23.4	10.0	5.7	---	NP	114.7	13.9	2.0
Bw3-- 23 to 28	A-4 (0)	SM	---	---	100	99.2	98.0	93.6	83.7	43.4	18.1	8.5	3.8	---	NP	121.8	11.1	2.0
2C1-- 28 to 37	A-1-a	SW	---	100	94.2	80.0	64.9	47.2	10.8	2.7	---	---	---	---	NP	130.7	8.0	2.0
2C2-- 37 to 78	A-1-a	GW	---	96.4	73.5	58.2	46.4	34.4	9.0	0.7	---	---	---	---	NP	131.1	8.5	0.0
Covington silty clay: (S82-NY-39-02)																		
Ap--- 0 to 7	A-7-5(19)	OH	---	---	---	100	99.8	99.6	98.8	97.0	74.3	57.3	38.0	53.2	39.5	84.6	30.2	10.0
Bg--- 7 to 13	A-7-5(24)	MH	---	---	---	---	100	99.6	98.7	97.3	81.5	71.4	53.9	51.7	31.7	94.3	26.4	11.0
Btg-- 13 to 28	A-7-5(27)	MH	---	---	---	100	99.9	99.8	99.2	98.6	87.0	74.0	55.1	53.4	30.6	97.2	25.0	12.0
C---- 28 to 60	A-6 (13)	CL-ML	---	---	---	100	99.6	98.9	98.1	97.0	72.2	53.3	35.7	35.1	22.5	104.5	20.6	8.0
Halcott channery silt loam: (S82-NY-39-15)																		
A1--- 0 to 5	A-4 (0)	GM	0	---	94.4	76.7	62.6	51.2	45.0	44.2	24.9	8.6	3.9	---	NP	104.1	18.1	3.5
Bw--- 5 to 13	A-1-b	GM	0	95.2	68.0	45.0	30.7	21.4	18.2	17.4	5.9	2.0	0.6	---	NP	115.8	14.3	2.0
Kingsbury clay loam: (S82-NY-39-04))																		
Ap--- 0 to 7	A-4 (4)	OL	---	---	---	---	100	99.1	88.8	70.4	41.2	29.6	20.6	36.3	30.8	96.5	23.0	6.0
B&E-- 7 to 14	A-6 (12)	CL-ML	---	---	---	100	99.8	99.3	95.5	84.7	59.7	49.8	40.3	37.3	24.0	108.7	23.8	8.0
Bt1g- 14 to 23	A-7-6(18)	CL-ML	---	---	---	---	100	99.9	98.7	92.0	72.3	59.4	45.2	42.2	25.1	99.9	22.9	9.0
Bt2g- 23 to 36	A-7-6(21)	CL-ML	---	---	---	---	---	100	99.6	95.6	79.6	65.6	50.5	46.8	27.6	100.2	23.4	10.0
C---- 36 to 70	A-7-6(24)	CL-ML	---	---	---	100	99.8	99.4	99.0	98.3	81.6	59.7	43.6	46.3	25.9	99.1	24.5	9.0

TABLE 18.--ENGINEERING INDEX TEST DATA--Continued

Soil name, report number, horizon, and depth in inches	Classification		Grain-size distribution										LL	PI	Moisture density		LS
			>3	Percentage passing sieve--							Percentage smaller than--				MD	OM	
	AASHTO	Unified		2 inch	3/4 inch	3/8 inch	No. 4	No. 10	No. 40	No. 200	.02 mm	.005 mm	.002 mm				
			Pct											Pct		Lb/ cu ft	Pct	Pct
Lewbeach channery silt loam: (S82-NY-39-07)																	
Ap--- 0 to 6	A-4 (0)	OL	0	94.6	89.7	83.5	78.7	73.5	63.8	52.8	24.1	7.0	3.5	---	NP	91.2	23.4	5.0
Bw--- 6 to 18	A-2-4	GM	0	94.6	78.4	68.6	60.3	52.1	43.3	34.1	17.2	7.0	2.9	---	NP	114.8	15.4	4.5
Bx1-- 18 to 28	A-2-4	SM	0	93.6	79.5	72.3	64.9	56.8	44.0	29.0	14.4	6.6	3.2	19.5	16.9	127.1	9.3	2.0
Bx2-- 28 to 50	A-2-4	SM	0	95.4	81.0	73.8	68.2	61.2	48.5	34.6	19.1	10.8	6.0	20.2	18.4	127.5	10.0	2.0
C---- 50+	A-4 (0)	SM	0	97.2	88.5	80.9	72.6	64.6	53.7	42.1	24.7	14.6	8.8	20.0	17.4	129.1	9.3	4.0
Onteora silt loam: (S79NY-105-015)																		
Ap--- 0 to 9	A-4 (6)	OL	---	100	89.0	84.9	83.0	81.9	78.7	66.0	37.6	14.9	6.3	41.6	32.3	98.0	20.9	4.0
E---- 9 to 14	A-4 (0)	ML	---	100	89.6	80.4	76.8	74.2	70.1	55.5	32.5	13.9	6.3	28.4	25.8	109.4	15.4	4.0
Bx1-- 14 to 25	A-4 (0)	GM	0	93.2	82.4	76.0	71.6	66.8	60.2	49.6	27.4	9.3	3.1	---	NP	118.1	12.2	1.0
Bx2-- 25 to 43	A-2-4	GM	0	95.1	79.2	71.0	63.7	56.6	45.6	33.7	20.5	7.8	2.4	---	NP	126.8	9.6	2.0
C---- 43 to 60	A-4 (0)	GM-GC	0	97.4	83.4	70.7	60.7	53.5	44.2	36.5	27.5	15.4	5.2	24.8	19.0	126.8	10.1	2.0
Vergennes loam: (S82-NY-39-02)																		
Ap--- 0 to 10	A-4(2)	CL-ML	---	---	---	100	99.9	99.6	97.9	68.4	42.1	34.4	21.7	27.3	23.1	103.9	18.3	5.0
E---- 10 to 17	A-4(0)	ML	---	---	---	---	100	99.8	97.5	68.3	44.4	38.2	22.5	20.6	17.1	114.3	14.3	4.0
B&E-- 17 to 26	A-6(15)	CL-ML	---	---	---	---	100	99.9	98.3	84.6	59.0	50.3	35.3	40.4	23.7	100.7	22.6	9.0
Bt--- 26 to 34	A-7-5(18)	ML	---	---	---	---	---	100	99.8	96.3	87.5	72.9	49.8	45.2	30.8	95.8	24.4	10.0
Bc--- 34 to 47	A-7-6(21)	ML	---	---	---	---	---	---	---	99.5	86.5	74.6	50.1	46.8	29.5	94.5	27.1	10.0
C---- 47 to 60	A-7-6(25)	MH	---	---	---	100	99.6	99.2	98.8	98.1	88.5	76.5	51.8	50.8	29.7	96.7	26.1	11.0
Vly channery loam: (S82-NY-39-14)																		
A1--- 0 to 2	A-4(0)	GM	0	99.0	83.9	68.0	53.8	45.0	41.7	39.0	13.5	4.1	1.8	---	NP	102.3	17.5	4.0
Bw3-- 21 to 28	A-1-b	GM	0	98.6	72.5	42.2	32.1	25.4	21.6	19.7	7.7	2.4	1.0	---	NP	122.1	11.7	2.0

TABLE 19.--RELATIONSHIPS BETWEEN SOIL SERIES, PARENT MATERIAL, LANDSCAPE POSITION, TEMPERATURE, AND DRAINAGE

Soil characteristics	Excessively drained	Somewhat excessively drained	Well drained	Moderately well drained	Somewhat poorly drained	Poorly drained	Very poorly drained
	SOILS ON TILL PLAINS						
Very deep soils that have an argillic horizon; formed in moderately fine textured, grayish brown glacial till; mean annual temperature more than 45 °F				Nunda	Burdett	Lyons	Lyons
Very deep soils that have a fragipan; formed in medium textured, brownish glacial till; mean annual temperature more than 45 °F				Mardin	Volusia	Alden	Alden
Very deep soils that have a fragipan; formed in medium textured, brownish glacial till; mean annual temperature more than 45 °F			Lackawanna	Wellsboro	Morris		
Very deep soils that have a fragipan; formed in medium textured, reddish glacial till; mean annual temperature less than 45 °F			Lewbeach	Willowemoc	Onteora	Suny	Suny
Very deep soils that formed in medium textured, brownish glacial till; mean annual temperature more than 45 °F			Valois	Chautauqua	Busti		
Very deep soils that formed in medium textured, reddish glacial till; mean annual temperature more than 45 °F			Maplecrest				
Very deep soils that formed in reddish glacial till; mean annual temperature more than 45 °F			Elka				
Moderately deep, medium textured soils that formed in brownish glacial till over interbedded sandstone, siltstone, and shale; mean annual temperature more than 45 °F			Lordstown				

TABLE 19.--RELATIONSHIPS BETWEEN SOIL SERIES, PARENT MATERIAL, LANDSCAPE POSITION, TEMPERATURE, AND DRAINAGE--Continued

Soil characteristics	Excessively drained	Somewhat excessively drained	Well drained	Moderately well drained	Somewhat poorly drained	Poorly drained	Very poorly drained
	SOILS ON TILL PLAINS						
Moderately deep soils that formed in medium textured, reddish glacial till over interbedded sandstone, siltstone, and shale; mean annual temperature more than 45 °F		Oquaga	Oquaga				
Moderately deep soils that formed in medium textured, reddish glacial till over interbedded sandstone, siltstone, and shale; mean annual temperature less than 45 °F		Vly	Vly				
Shallow or moderately deep soils that formed in medium textured, brownish glacial till over limestone; mean annual temperature more than 45 °F		Farmington	Farmington, Galway.	Galway			
Shallow soils that formed in medium textured, brownish glacial till over interbedded sandstone, siltstone, and shale; averaging more than 35 percent rock fragments; mean annual temperature more than 45 °F		Arnot	Arnot	Arnot			
Shallow soils that formed in medium textured, brownish glacial till over interbedded sandstone, siltstone, and shale; averaging less than 35 percent rock fragments; mean annual temperature more than 45 °F					Tuller	Tuller	
Shallow soils that formed in medium textured, reddish glacial till over interbedded sandstone, siltstone, and shale; averaging more than 35 percent rock fragments; mean annual temperature less than 45 °F		Halcott	Halcott	Halcott	Tor	Tor	
Shallow, medium textured soils that formed in medium textured, brownish glacial till over folded shale; mean annual temperature more than 45 °F		Nassau					

TABLE 19.--RELATIONSHIPS BETWEEN SOIL SERIES, PARENT MATERIAL, LANDSCAPE POSITION, TEMPERATURE, AND DRAINAGE--Continued

Soil characteristics	Excessively drained	Somewhat excessively drained	Well drained	Moderately well drained	Somewhat poorly drained	Poorly drained	Very poorly drained
	SOILS ON OUTWASH PLAINS, KAMES, AND TERRACES						
Very deep, medium textured and moderately coarse textured soils that formed in reddish glaciofluvial deposits		Tunkhannock	Tunkhannock				
Very deep, medium textured and moderately coarse textured soils that formed in brownish glaciofluvial deposits		Chenango	Chenango				
Very deep soils that formed in medium textured, brownish outwash underlain by very gravelly outwash			Riverhead				
	SOILS ON FLOOD PLAINS IN VALLEYS						
Very deep, medium textured soils that formed in brownish alluvial sediments underlain by sand and gravel			Tioga		Middlebury		
Very deep, medium textured soils that formed in brownish alluvial sediments						Wayland	Wayland
Very deep, medium textured soils that formed in reddish alluvial sediments			Barbour	Barbour			
Very deep, coarse textured to moderately fine textured soils that formed in brownish and grayish, thinly stratified alluvial sediments	Udifluvents	Udifluvents	Udifluvents	Udifluvents	Fluvaquents	Fluvaquents	Fluvaquents
	SOILS ON LACUSTRINE PLAINS						
Very deep soils that formed in medium textured, brownish lacustrine sediments underlain by clayey material				Elmridge	Shaker		

TABLE 19.--RELATIONSHIPS BETWEEN SOIL SERIES, PARENT MATERIAL, LANDSCAPE POSITION, TEMPERATURE, AND DRAINAGE--Continued

Soil characteristics	Excessively drained	Somewhat excessively drained	Well drained	Moderately well drained	Somewhat poorly drained	Poorly drained	Very poorly drained
	SOILS ON LACUSTRINE PLAINS						
Very deep soils that formed in fine textured, brownish lacustrine sediments and have an accumulation of clay in the subsoil				Hudson	Rhinebeck	Madalin	Madalin
Very deep soils that formed in very fine textured, brownish lacustrine sediments and have an accumulation of clay in the subsoil				Vergennes	Kingsbury	Covington	
Very deep, moderately fine textured soils that formed in brownish lacustrine sediments and have an accumulation of clay in the subsoil						Canandaigua	Canandaigua
	SOILS IN SWAMPS AND BOGS						
Very deep soils that formed in medium textured, grayish mineral deposits and are ponded much of the year							Hydraquents
Very deep soils that formed in well decomposed organic material more than 51 inches thick							Carlisle
Very deep soils that formed in well decomposed organic material more than 16 inches thick and are ponded much of the year							Medisaprists
	SOILS ON GLACIAL TILL, OUTWASH, AND LACUSTRINE PLAINS DISTURBED BY HUMAN ACTIVITIES						
Very deep soils that formed in medium textured, mixed soil material	Udorthents	Udorthents	Udorthents				
Very deep soils that formed in coarse textured, mixed soil material	Udipsamments	Udipsamments	Udipsamments				

TABLE 20.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Alden	Fine-loamy, mixed, nonacid, mesic Mollic Haplaquepts
Arnot	Loamy-skeletal, mixed, mesic Lithic Dystrochrepts
Barbour	Coarse-loamy over sandy or sandy-skeletal, mixed, mesic Fluventic Dystrochrepts
Basher	Coarse-loamy, mixed, mesic Fluvaquentic Dystrochrepts
Burdett	Fine-loamy, mixed, mesic Aeric Ochraqualfs
Busti	Coarse-loamy, mixed, nonacid, mesic Aeric Haplaquepts
Canandaigua	Fine-silty, mixed, nonacid, mesic Mollic Haplaquepts
Carlisle	Euic, mesic Typic Medisaprists
Chautauqua	Coarse-loamy, mixed, mesic Aquic Dystrochrepts
Chenango	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Covington	Very fine, illitic, mesic Mollic Ochraqualfs
Elka	Coarse-loamy, mixed, frigid Typic Dystrochrepts
Elmridge	Coarse-loamy over clayey, mixed, mesic Aquic Dystric Eutrochrepts
Farmington	Loamy, mixed, mesic Lithic Eutrochrepts
Fluvaquents	Fluvaquents
Galway	Coarse-loamy, mixed, mesic Typic Eutrochrepts
Halcott	Loamy-skeletal, mixed, frigid Lithic Dystrochrepts
Hudson	Fine, illitic, mesic Glossaquic Hapludalfs
Hydraquents	Hydraquents
Kingsbury	Very fine, illitic, mesic Aeric Ochraqualfs
Lackawanna	Coarse-loamy, mixed, mesic Typic Fragiochrepts
Lewbeach	Coarse-loamy, mixed, frigid Typic Fragiochrepts
Lordstown	Coarse-loamy, mixed, mesic Typic Dystrochrepts
Lyons	Fine-loamy, mixed, nonacid, mesic Mollic Haplaquepts
Madalin	Fine, illitic, mesic Mollic Ochraqualfs
Maplecrest	Coarse-loamy, mixed, mesic Typic Dystrochrepts
Mardin	Coarse-loamy, mixed, mesic Typic Fragiochrepts
Medisaprists	Medisaprists
Middlebury	Coarse-loamy, mixed, mesic Fluvaquentic Eutrochrepts
Morris	Coarse-loamy, mixed, mesic Aeric Fragiaquepts
Nassau	Loamy-skeletal, mixed, mesic Lithic Dystrochrepts
Nunda	Fine-loamy, mixed, mesic Glossaquic Hapludalfs
Ochrepts	Ochrepts
Onteora	Coarse-loamy, mixed, frigid Aquic Fragiochrepts
Oquaga	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Rhinebeck	Fine, illitic, mesic Aeric Ochraqualfs
Riverhead	Coarse-loamy, mixed, mesic Typic Dystrochrepts
Shaker	Coarse-loamy over clayey, mixed, nonacid, mesic Aeric Haplaquepts
Suny	Coarse-loamy, mixed, acid, frigid Aeric Haplaquepts
Tioga	Coarse-loamy, mixed, mesic Dystric Fluventic Eutrochrepts
Tor	Loamy-skeletal, mixed, acid, frigid Lithic Haplaquepts
Tuller	Loamy, mixed, acid, mesic Lithic Haplaquepts
Tunkhannock	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Udifluvents	Udifluvents
Udipsamments	Udipsamments
Udorthents	Udorthents
Valois	Coarse-loamy, mixed, mesic Typic Dystrochrepts
Vergennes	Very fine, illitic, mesic Glossaquic Hapludalfs
Vly	Loamy-skeletal, mixed, frigid Typic Dystrochrepts
Volusia	Fine-loamy, mixed, mesic Aeric Fragiaquepts
Wayland	Fine-silty, mixed, nonacid, mesic Mollic Fluvaquents
Wellsboro	Coarse-loamy, mixed, mesic Typic Fragiochrepts
Willowemoc	Coarse-loamy, mixed, frigid Typic Fragiochrepts

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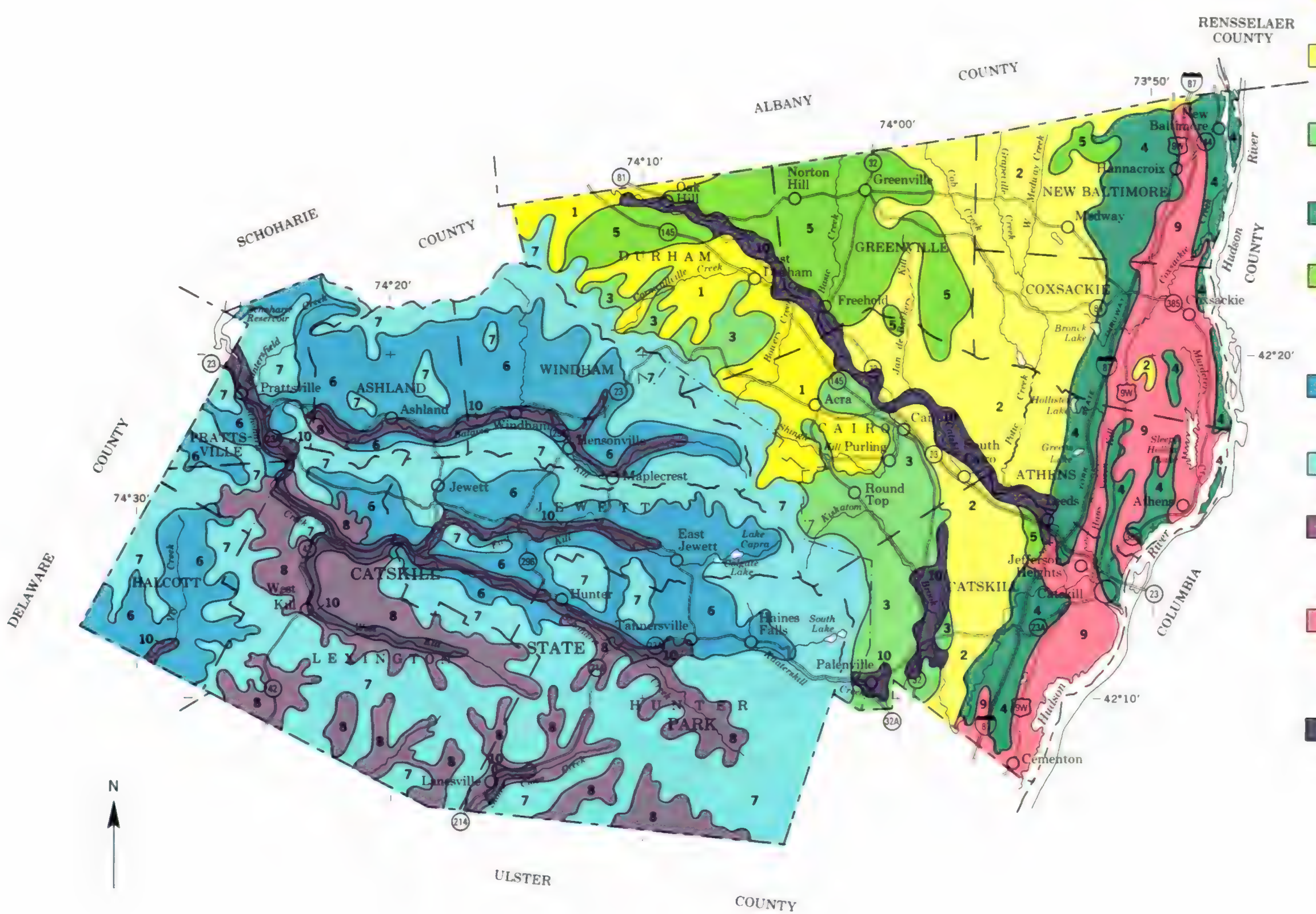


Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

LEGEND

MEDIUM TEXTURED AND MODERATELY FINE TEXTURED SOILS FORMED IN GLACIAL TILL ON UPLANDS

1 WELLSBORO-OQUAGA-MORRIS: Very deep and moderately deep, nearly level to steep, somewhat excessively drained to somewhat poorly drained, medium textured soils on the foothills of the Catskill Mountains

2 ARNOT-LORDSTOWN: Shallow and moderately deep, nearly level to very steep, somewhat excessively drained to moderately well drained, medium textured soils on the Catskill Mountains and their foothills

3 ARNOT-OQUAGA: Shallow and moderately deep, nearly level to very steep, somewhat excessively drained to moderately well drained, medium textured soils on the foothills of the Catskill Mountains

4 NASSUA-FARMINGTON: Shallow, gently sloping to very steep, well drained and somewhat excessively drained, medium textured soils on hills and ridges

5 BURDETT-NUNDA-LYONS: Very deep, nearly level to steep, moderately well drained to very poorly drained, moderately fine textured soils on till plains

MEDIUM TEXTURED SOILS FORMED IN GLACIAL TILL AT THE HIGHER ELEVATIONS OF THE CATSKILL MOUNTAINS

6 LEWBEACH-WILLOWEMOC-ONTEORA: Very deep, gently sloping to very steep, well drained to somewhat poorly drained, medium textured soils on hills and valley sides

7 VLY-HALCOTT: Moderately deep and shallow, gently sloping to very steep, somewhat excessively drained to moderately well drained, medium textured soils on ridges and mountainsides

8 ELKA: Very deep, gently sloping to very steep, well drained, medium textured soils on the sides of valleys

FINE TEXTURED SOILS FORMED IN LACUSTRINE SEDIMENTS ON LAKE PLAINS

9 KINGSBURY-RHINEBECK-HUDSON: Very deep, nearly level to very steep, moderately well drained and somewhat poorly drained, fine textured soils on ridges and side slopes

MEDIUM TEXTURED SOILS FORMED IN ALLUVIAL SEDIMENTS ON FLOOD PLAINS

10 BARBER-WAYLAND-BASHER: Very deep, nearly level, well drained, moderately well drained, and poorly drained, medium textured soils on flood plains

Compiled 1989

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
CORNELL UNIVERSITY AGRICULTURAL EXPERIMENT STATION

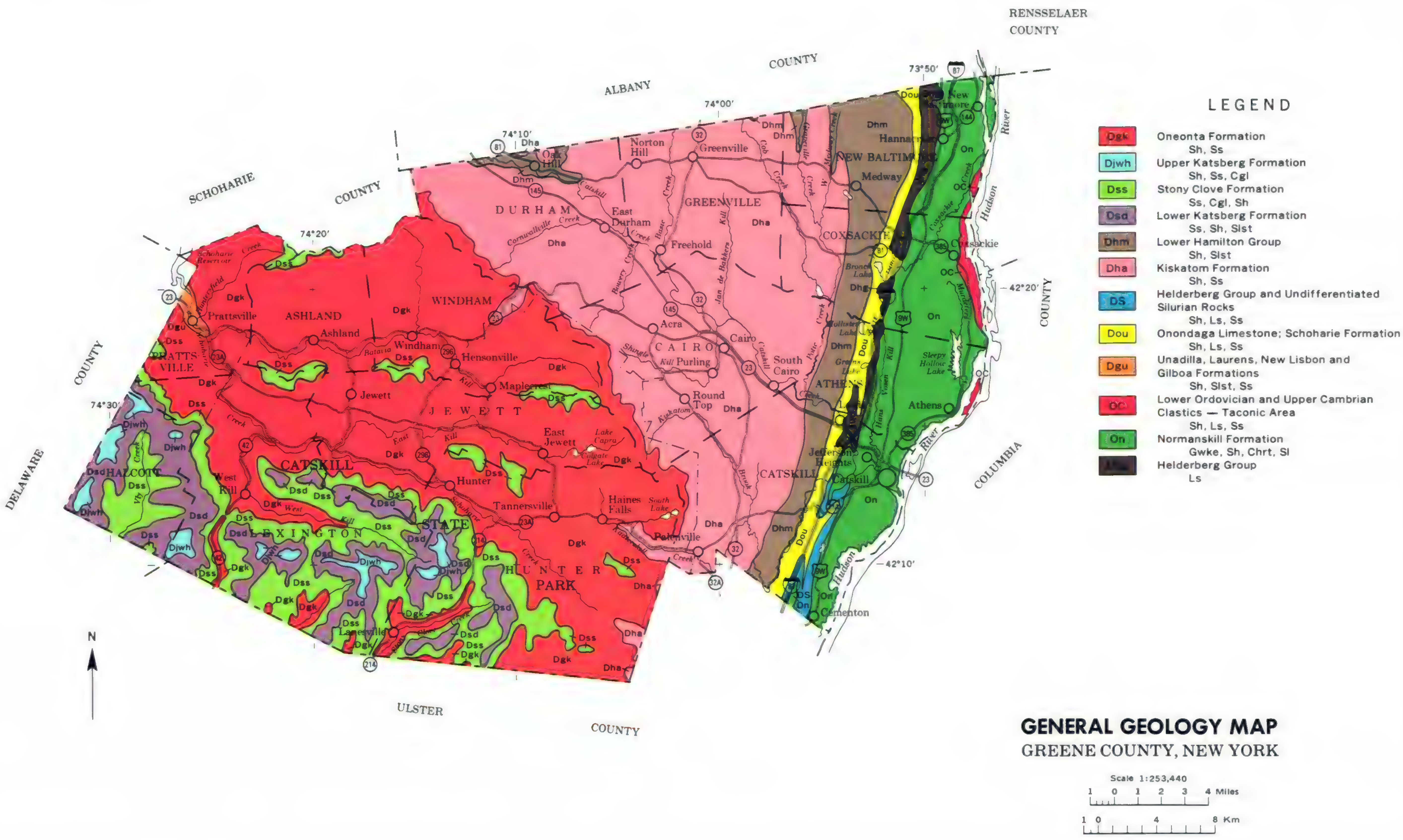
GENERAL SOIL MAP

GREENE COUNTY, NEW YORK

Scale 1:253,440

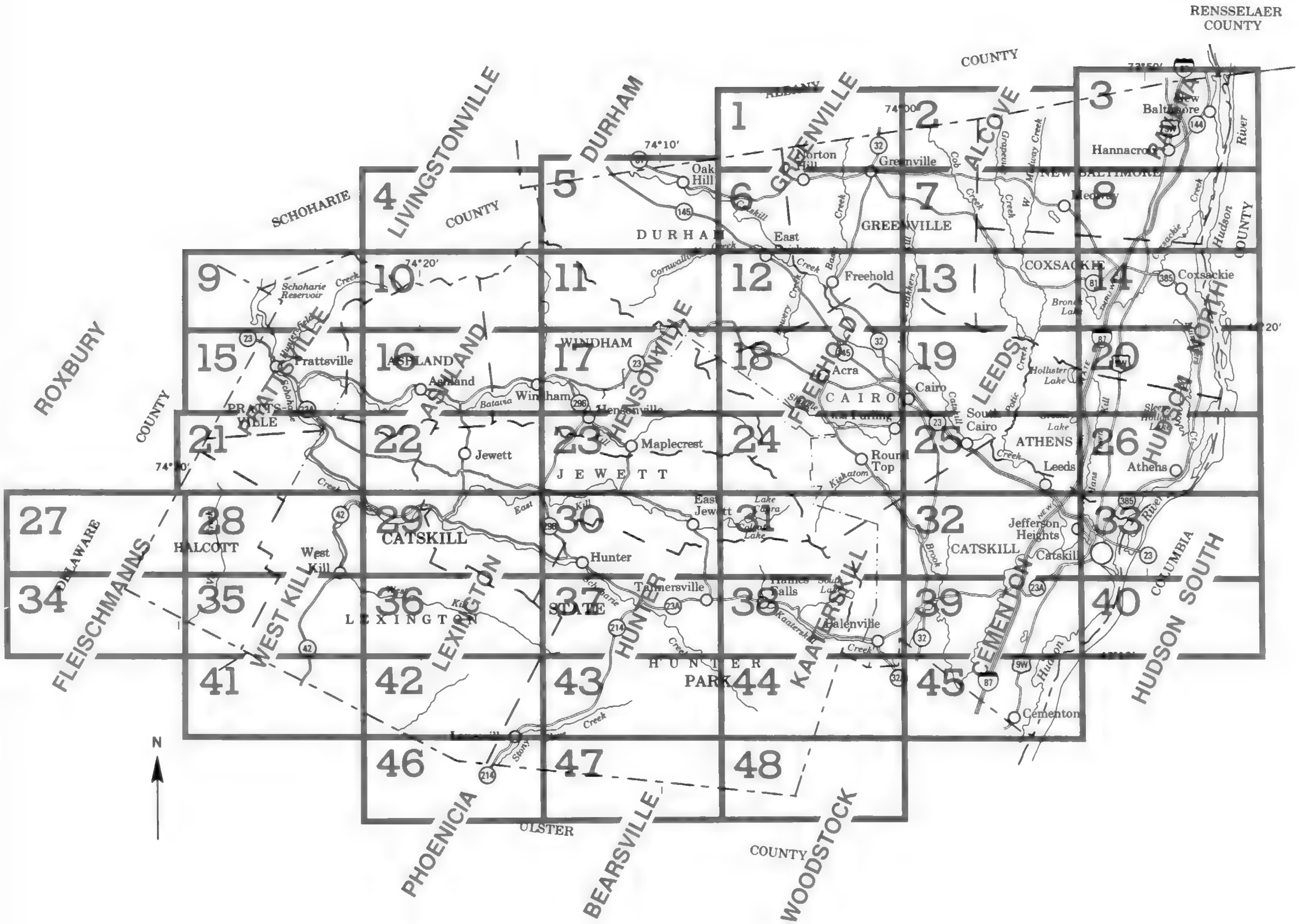
1 0 1 2 3 4 Mi

1 0 4 8 Km



GENERAL GEOLOGY MAP

GREENE COUNTY, NEW YORK



Original text from each individual map sheet read:

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1978 - 1986 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

INDEX TO MAP SHEETS

GREENE COUNTY, NEW YORK

Scale 1:253,440

1 0 1 2 3 4 Mi

1 0 4 8 Km

SOIL LEGEND

Publication symbols consist of letters (e.g., AuB, HvE, Mk). The first letter, always a capital, is the initial letter of the soil name. The second letter is lower case and separates map units except that it does not separate slope phases. The third letter, always a capital: A,B,C,D,E,and F indicates the slope. Symbols without a slope letter are for nearly level soils, soils named for higher categories or for miscellaneous areas. The fourth part of the symbol is a number which represents the erosion.

SYMBOL	NAME
Ad	Alden silt loam
Am	Alden silt loam, very stony
ArA	Arnot channery silt loam, 0 to 3 percent slopes
ArB	Arnot channery silt loam, 3 to 8 percent slopes
ArC	Arnot channery silt loam, 8 to 15 percent slopes
AsC	Arnot-Lordstown channery silt loams, rolling
AsD	Arnot-Lordstown channery silt loams, 15 to 25 percent slopes
AsE	Arnot-Lordstown channery silt loams, 25 to 45 percent slopes
AuC	Arnot-Lordstown channery silt loams, 3 to 15 percent slopes, rocky
AvD	Arnot-Lordstown channery silt loams, 15 to 35 percent slopes, very rocky
AvF	Arnot-Lordstown channery silt loams, 35 to 55 percent slopes, very rocky
AwC	Arnot-Oquaga complex, rolling
AwD	Arnot-Oquaga complex, 15 to 25 percent slopes
AwE	Arnot-Oquaga complex, 25 to 45 percent slopes
Ba	Barbour loam
Bs	Basher silt loam
BuA	Burdett channery silt loam, 0 to 3 percent slopes
BuB	Burdett channery silt loam, 3 to 8 percent slopes
BuC	Burdett channery silt loam, 8 to 15 percent slopes
BvC	Burdett channery silt loam, 3 to 15 percent slopes, very stony
BwB	Busti silt loam, 3 to 8 percent slopes
Ca	Canandaigua silt loam
Cc	Carlisle muck
ChB	Chautauqua loam, 3 to 8 percent slopes
ChC	Chautauqua loam, 8 to 15 percent slopes
CnA	Chenango gravelly loam, 0 to 3 percent slopes
CnB	Chenango gravelly loam, 3 to 8 percent slopes
CnC	Chenango gravelly loam, rolling
Co	Covington and Meadalin soils
Du	Dumps, landfill
ElB	Elka channery loam, 3 to 8 percent slopes
ElC	Elka channery loam, 8 to 15 percent slopes
ElD	Elka channery loam, 15 to 25 percent slopes
EmC	Elka channery loam, rolling, very stony
EmD	Elka channery loam, hilly, very stony
EmF	Elka channery loam, very steep, very stony
EnA	Elmridge very fine sandy loam, 0 to 3 percent slopes
EnB	Elmridge very fine sandy loam, 3 to 8 percent slopes
FaC	Farmington gravelly silt loam, rolling, rocky
FaD	Farmington gravelly silt loam, hilly, rocky
FaE	Farmington gravelly silt loam, steep, rocky
Fu	Fluvaquents-Udifluvents complex, frequently flooded
GfB	Galway-Farmington gravelly silt loams, 2 to 8 percent slopes, rocky
GfC	Galway-Farmington gravelly silt loams, rolling, rocky
GfD	Galway-Farmington gravelly silt loam, hilly, rocky
HaB	Halcott channery silt loam, 3 to 8 percent slopes
HaC	Halcott channery silt loam, 8 to 15 percent slopes
HlC	Halcott-Vly complex, rolling
HlD	Halcott-Vly complex, 15 to 25 percent slopes
HlE	Halcott-Vly complex, 25 to 45 percent slopes
HvB	Hudson and Vergennes soils, 3 to 8 percent slopes
HvC	Hudson and Vergennes soils, 8 to 15 percent slopes
HvE	Hudson and Vergennes soils, 25 to 50 percent slopes
HwC3	Hudson and Vergennes silty clay loam, 8 to 15 percent slopes, severely eroded
HwD3	Hudson and Vergennes silty clay loams, 15 to 25 percent slopes, severely eroded
KrA	Kingsbury and Rhinebeck soils, 0 to 3 percent slopes
KrB	Kingsbury and Rhinebeck soils, 3 to 8 percent slopes
LaB	Lackawanna channery loam, 3 to 8 percent slopes
LaC	Lackawanna channery loam, 8 to 15 percent slopes
LaD	Lackawanna channery loam, 15 to 25 percent slopes
LaE	Lackawanna channery loam, 25 to 35 percent slopes
LcC	Lackawanna and Wellsboro channery loams, 3 to 15 percent slopes, very stony
LcD	Lackawanna and Wellsboro channery loams, 15 to 25 percent slopes, very stony
LeB	Lewbeach channery silt loam, 3 to 8 percent slopes
LeC	Lewbeach channery silt loam, 8 to 15 percent slopes
LeD	Lewbeach channery silt loam, 15 to 25 percent slopes
LeE	Lewbeach channery silt loam, 25 to 35 percent slopes
LfF	Lewbeach channery silt loam, 35 to 55 percent slopes, very stony
LgF	Lewbeach channery silt loam, very steep, very bouldery
LlC	Lewbeach and Willowemoc channery silt loams, 3 to 15 percent slopes, very stony
LlD	Lewbeach and Willowemoc channery silt loams, 15 to 35 percent slopes, very stony
LmC	Lewbeach and Willowemoc channery silt loams, strongly sloping, very bouldery
LmD	Lewbeach and Willowemoc channery silt loams, moderately steep, very bouldery
LoA	Lordstown channery silt loam, 0 to 3 percent slopes
LoB	Lordstown channery silt loam, 3 to 8 percent slopes
LoC	Lordstown channery silt loam, 8 to 15 percent slopes
LoD	Lordstown channery silt loam, 15 to 25 percent slopes
Lv	Lyons silt loam
Ly	Lyons silt loam, very stony
MaB	Maplecrest gravelly silt loam, 3 to 8 percent slopes
MaC	Maplecrest gravelly silt loam, rolling
MaD	Maplecrest gravelly silt loam ,15 to 25 percent slopes
MaE	Maplecrest gravelly silt loam, 25 to 45 percent slopes
MdB	Mardin gravelly silt loam, 3 to 8 percent slopes
MdC	Mardin gravelly silt loam, 8 to 15 percent slopes
MdD	Mardin gravelly silt loam, 15 to 25 percent slopes
[illegible]	Mardin gravelly silt loam, 3 to 15 percent slopes, very stony
[illegible]	Medisaprists, ponded
Mh	Medisaprists-Hydraquents, complex, tidal marsh
Mi	Middlebury silt loam
MoA	Morris channery silt loam, 0 to 3 percent slopes
MoB	Morris channery silt loam, 3 to 8 percent slopes
MoC	Morris channery silt loam, 8 to 15 percent slopes
MpC	Morris channery silt loam, 3 to 15 percent slopes, very stony
NaC	Nassau channery silt loam, rolling
NrC	Nassau channery silt loam, rolling, very rocky
NrD	Nassau channery silt loam, hilly, very rocky
NrE	Nassau channery silt loam, steep, very rocky
NuB	Nunda silt loam, 3 to 8 percent slopes
NuC	Nunda silt loam, 8 to 15 percent slopes
NuD	Nunda silt loam, 15 to 25 percent slopes
NuE	Nunda silt loam, 25 to 35 percent slopes
NvC	Nunda silt loam, 3 to 15 percent slopes, very stony
NvE	Nunda silt loam, 15 to 35 percent slopes, very stony
Oc	Ochrepts, frequently flooded
OnB	Onteora silt loam, 3 to 8 percent slopes
OnC	Onteora silt loam, 8 to 15 percent slopes
OoC	Onteora silt loam, 3 to 15 percent slopes, very stony
OpC	Onteora silt loam, rolling, very bouldery
OrB	Oquaga very channery silt loam, 3 to 8 percent slopes
OrC	Oquaga very channery silt loam, 8 to 15 percent slopes
OrD	Oquaga very channery silt loam, 15 to 25 percent slopes
OsC	Oquaga-Arnot complex, 3 to 15 percent slopes, very rocky
OsD	Oquaga-Arnot complex, 15 to 35 percent slopes, very rocky
OsF	Oquaga-Arnot complex, 35 to 55 percent slopes, very rocky
Pg	Pits, gravel
Pr	Pits, quarry
RhA	Riverhead loam, 0 to 3 percent slopes
RhB	Riverhead loam, 3 to 8 percent slopes
RhC	Riverhead loam, rolling
RhD	Riverhead loam, hilly
Sh	Shaker very fine sandy loam
Su	Suny gravelly silt loam, very stony
Ta	Tioga loam
To	Tor flaggy loam
Tr	Tor flaggy loam, very bouldery
Ts	Tuller channery silt loam
Tt	Tuller channery silt loam, very stony
TuA	Tunkhannock gravelly loam, 0 to 3 percent slopes
TuB	Tunkhannock gravelly loam, 3 to 8 percent slopes
TuC	Tunkhannock gravelly loam, rolling
TuD	Tunkhannock gravelly loam, hilly
TvB	Tunkhannock gravelly loam, fan, 3 to 8 percent slopes
TwE	Tunkhannock and Chenango gravelly loams, 25 to 45 percent slopes
Ud	Udipsamments, dredged
Ur	Udorthents, loamy
VaB	Valois gravelly loam, 3 to 8 percent slopes
VaC	Valois gravelly loam, rolling
VaD	Valois gravelly loam, 15 to 25 percent slopes
VaF	Valois gravelly loam, 25 to 60 percent slopes
VbE	Valois gravelly loam, 15 to 35 percent slopes, very stony
VbF	Valois gravelly loam, 35 to 50 percent slopes, very stony
VdB	Valois-Nassau complex, undulating
VdD	Valois-Nassau complex, hilly
VeB	Vly very channery silt loam, 3 to 8 percent slopes
VeC	Vly very channery silt loam, 8 to 15 percent slopes
VeD	Vly very channery silt loam, 15 to 25 percent slopes
VhC	Vly-Halcott complex, rolling, very rocky
VhD	Vly-Halcott complex, hilly, very rocky
VhF	Vly-Halcott complex, very steep, very rocky
VoA	Volusia channery loam, 0 to 3 percent slopes
VoB	Volusia channery loam, 3 to 8 percent slopes
VoC	Volusia channery loam, 8 to 15 percent slopes
VpC	Volusia channery silt loam, 3 to 15 percent slopes, very stony
Wa	Wayland silt loam
WeB	Wellsboro channery loam, 3 to 8 percent slopes
WeC	Wellsboro channery loam, 8 to 15 percent slopes
WeD	Wellsboro channery loam, 15 to 25 percent slopes
WmB	Willowemoc channery silt loam, 3 to 8 percent slopes
WmC	Willowemoc channery silt loam, 8 to 15 percent slopes
WmD	Willowemoc channery silt loam, 15 to 25 percent slopes
W	Water

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline and neatline

AD HOC BOUNDARY (label) — Swift Airport

- Small airport, airfield, park, oilfield, cemetery, or flood pool — FLOOD POOL LINE

STATE COORDINATE TICK

LAND DIVISION CORNER (sections and land grants)

ROADS

- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEM & DESIGNATIONS

- Interstate — 21
- Federal — 173
- State — 28
- County, farm or ranch — 1283

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad

DAMS

- Large (to scale)
- Medium or Small — water, w

PITS

- Gravel pit
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban areas)
- Church
- School
- Indian mound (label) — Indian Mound
- Located object (label) — Tower
- Tank (label) — Gas
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label) — CANAL
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial — water, w
- Intermittent — int, i

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS — BuA ChB

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

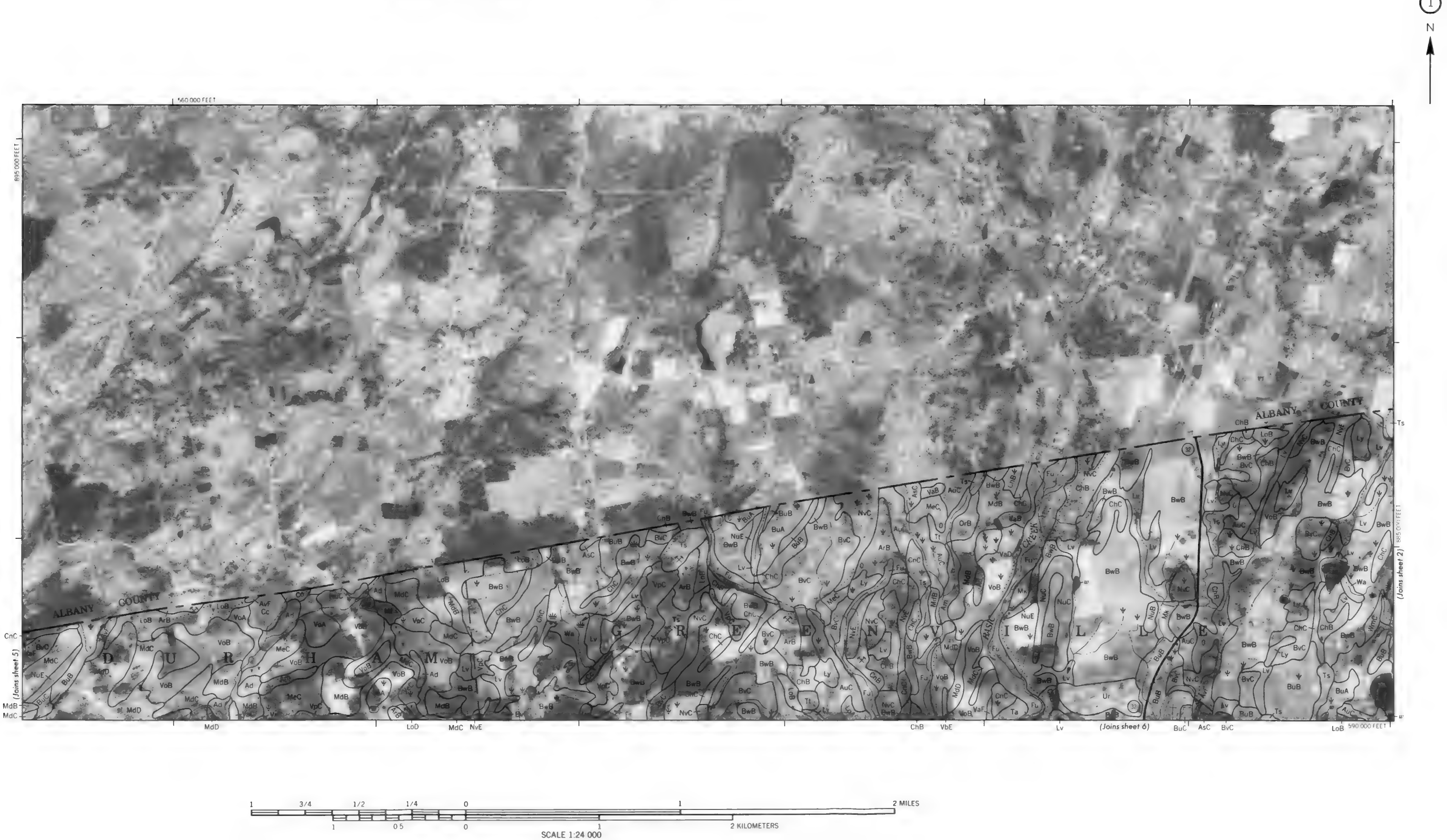
GULLY

DEPRESSION OR SINK

SOIL SAMPLE (normally not shown)

MISCELLANEOUS

- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot


1
N
560 000 FEET
895 000 FEET
590 000 FEET
ALBANY COUNTY
DURHAM
GREENVILLE
BASIC CREEK
(Joins sheet 5)
(Joins sheet 2)
(Joins sheet 6)
1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

2

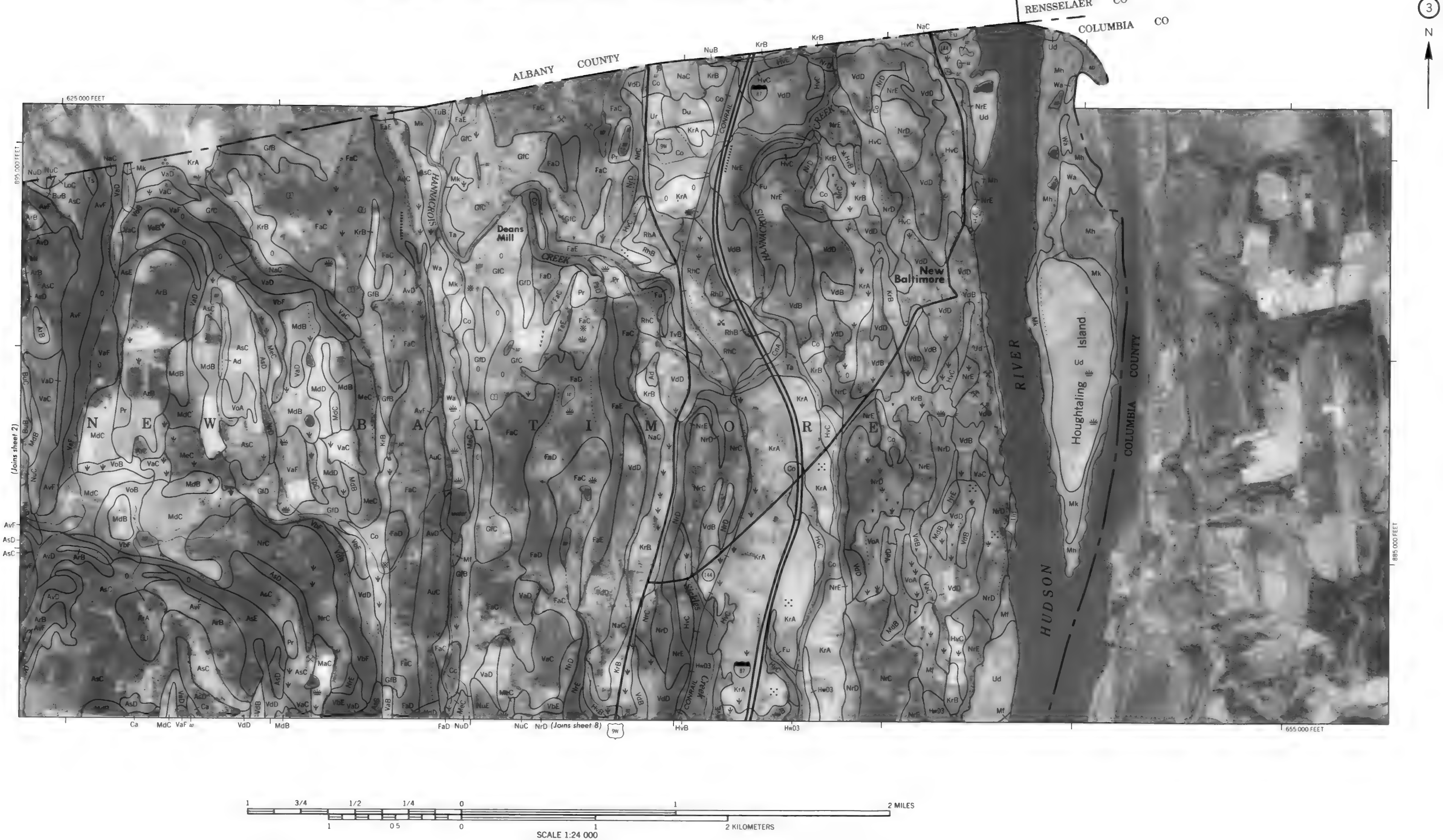
N

1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

SOIL SURVEY OF GREENE COUNTY, NEW YORK — SHEET NUMBER 3



4

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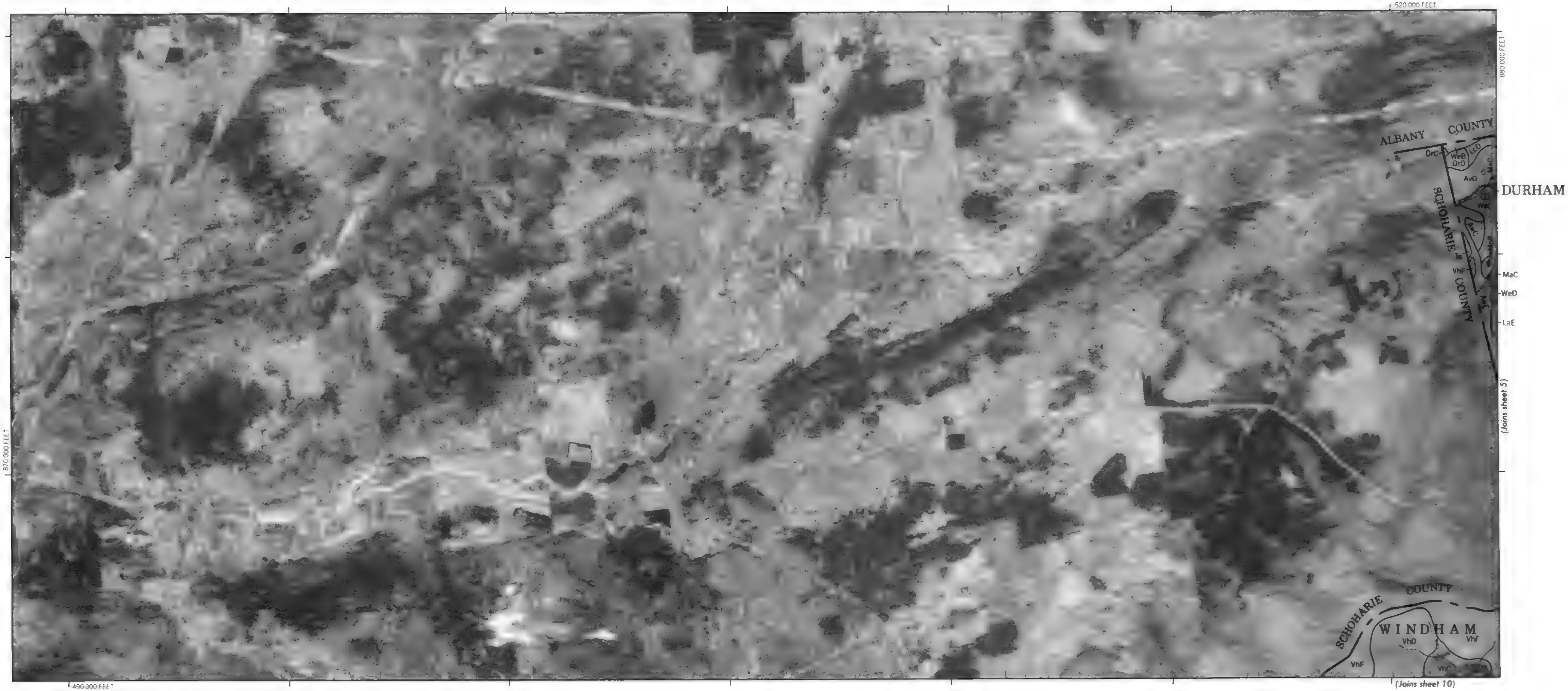
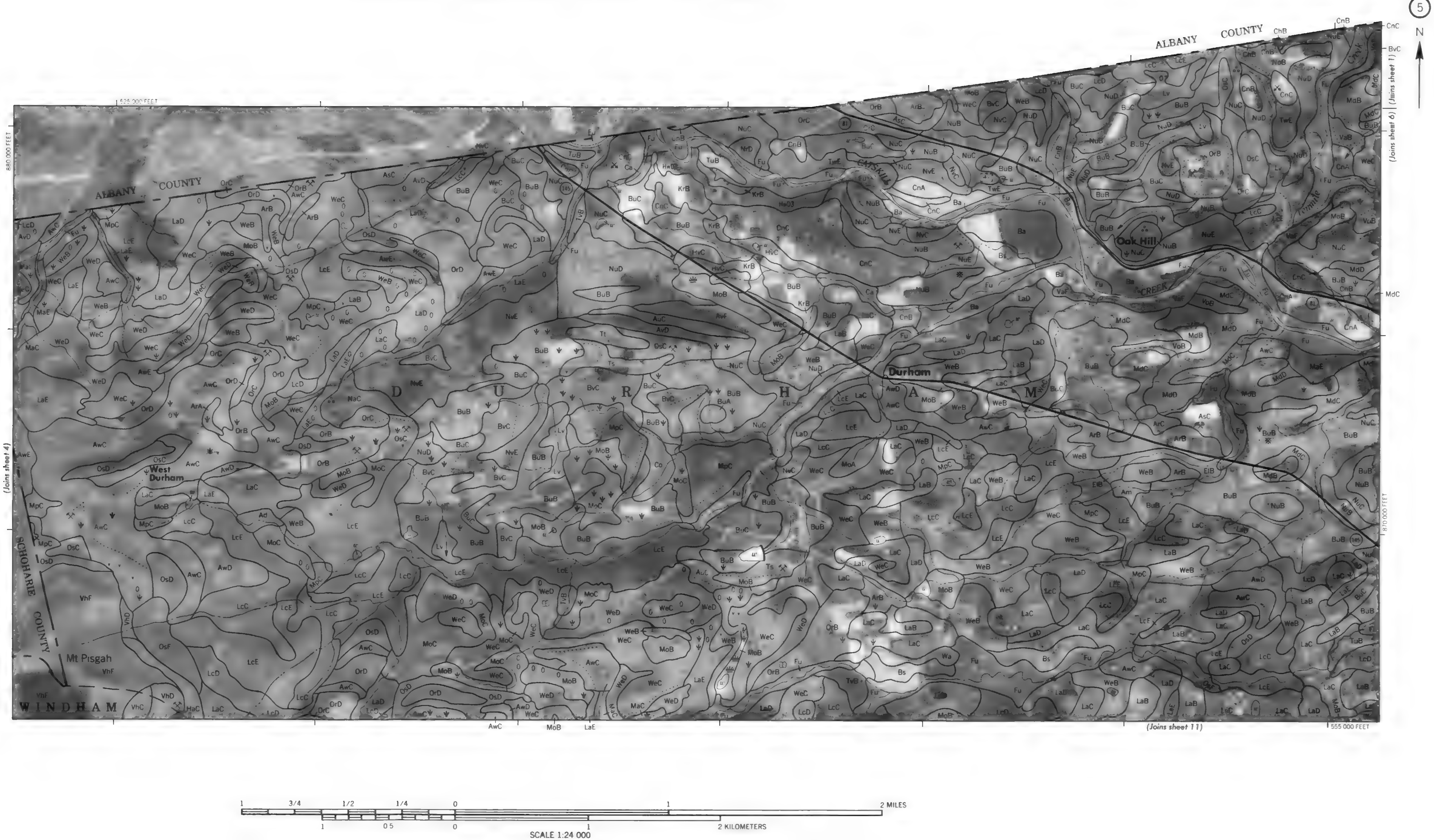


1 3/4 1/2 1/4 0 1 2 MILES

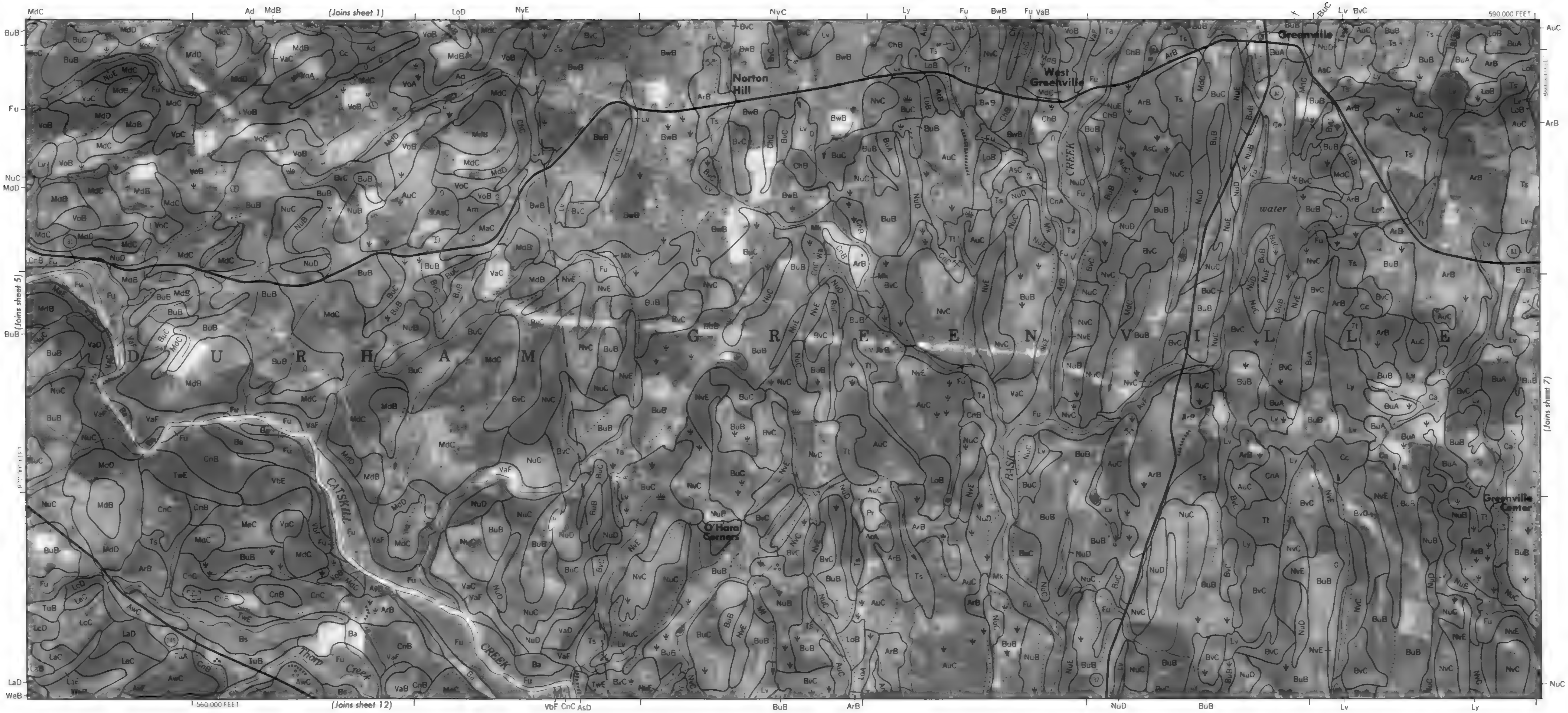
1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000


5
N
ALBANY COUNTY
(Joins sheet 1)
(Joins sheet 6)
(Joins sheet 4)
(Joins sheet 11)
SCHOHARIE COUNTY
WINDHAM
D U R H A M
Durham
West Durham
Oak Hill
Mt Pisgah
CATSKILL CREEK
525 000 FEET
555 000 FEET
880 000 FEET
870 000 FEET
2 MILES
2 KILOMETERS
SCALE 1:24 000

6

N



1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

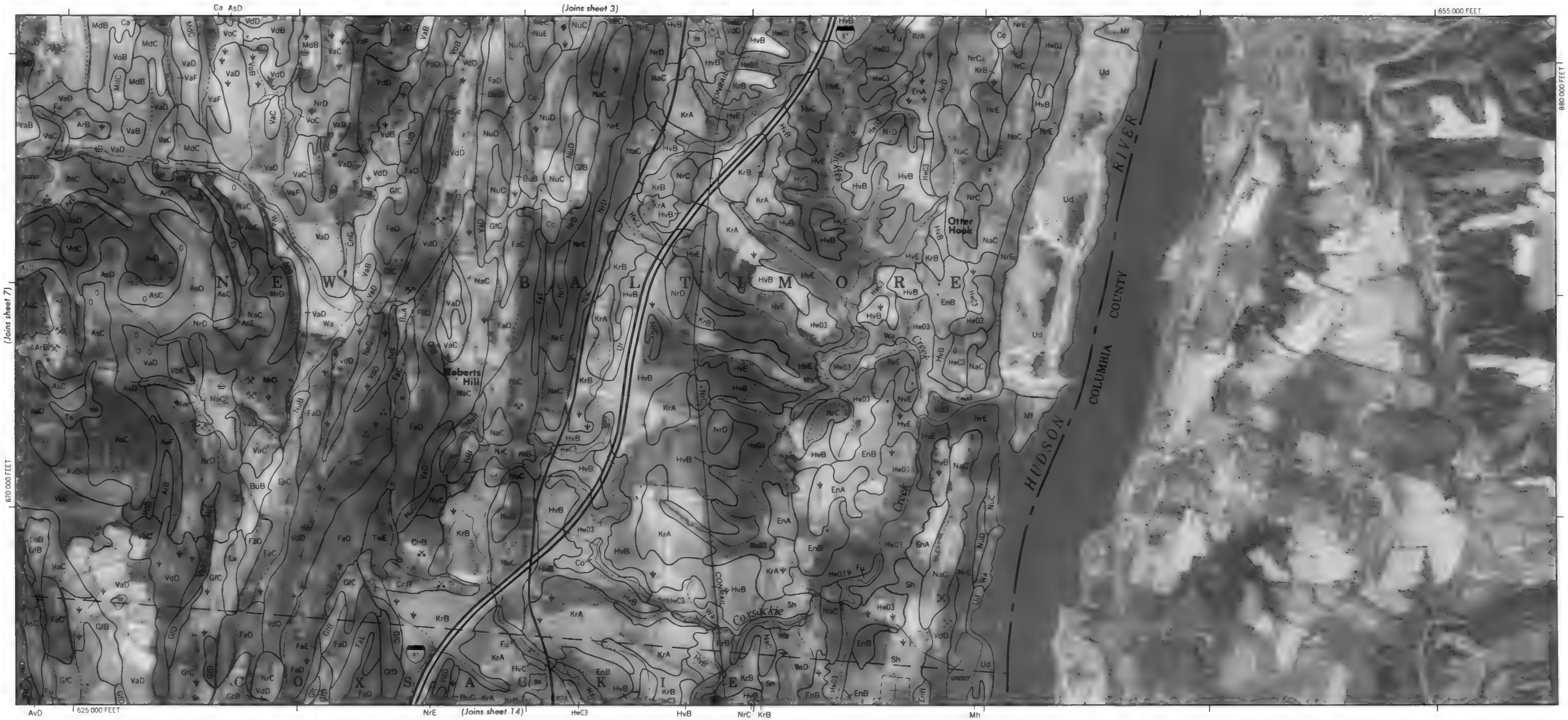
N

1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

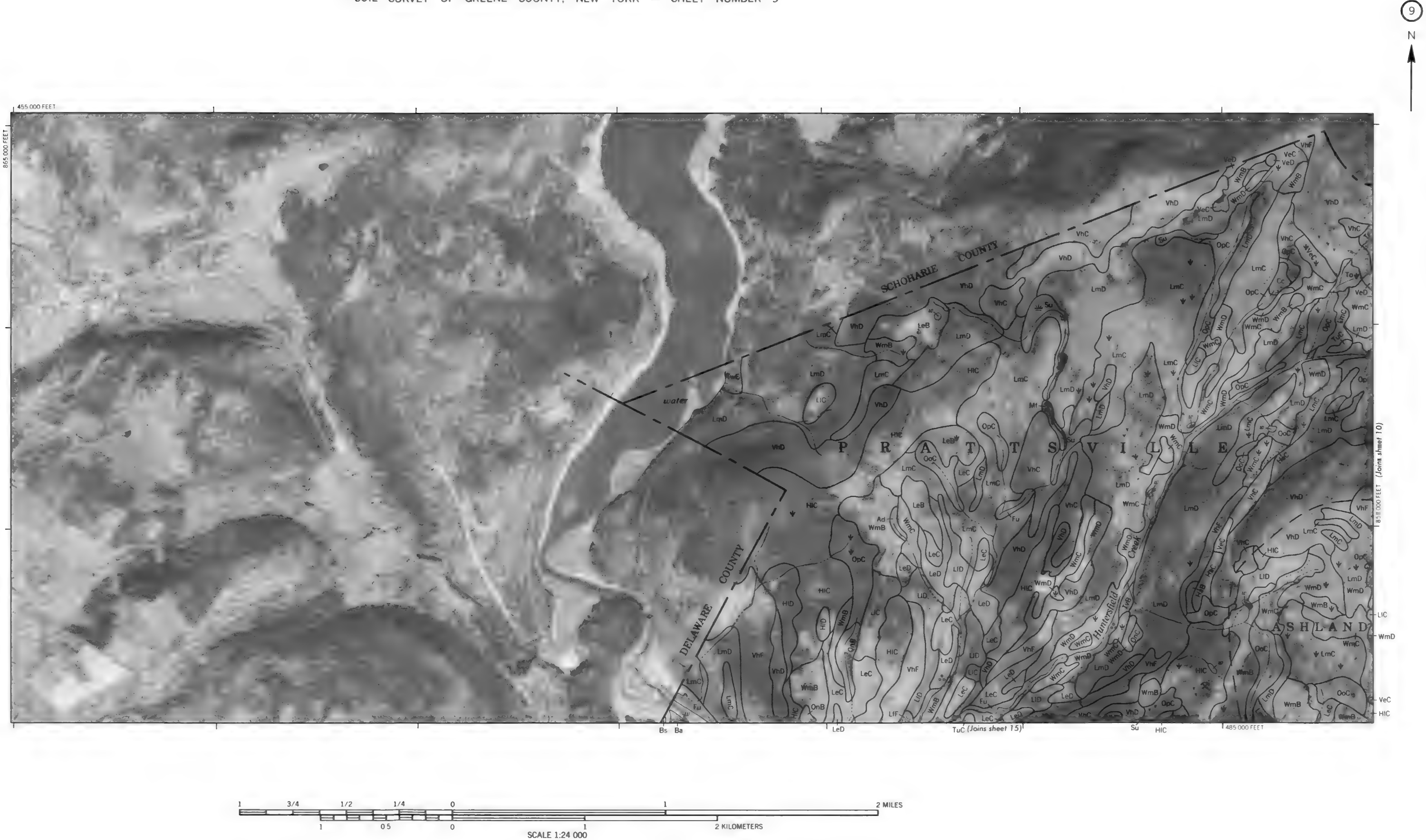
N



1 3/4 1/2 1/4 0 1 2 MILES

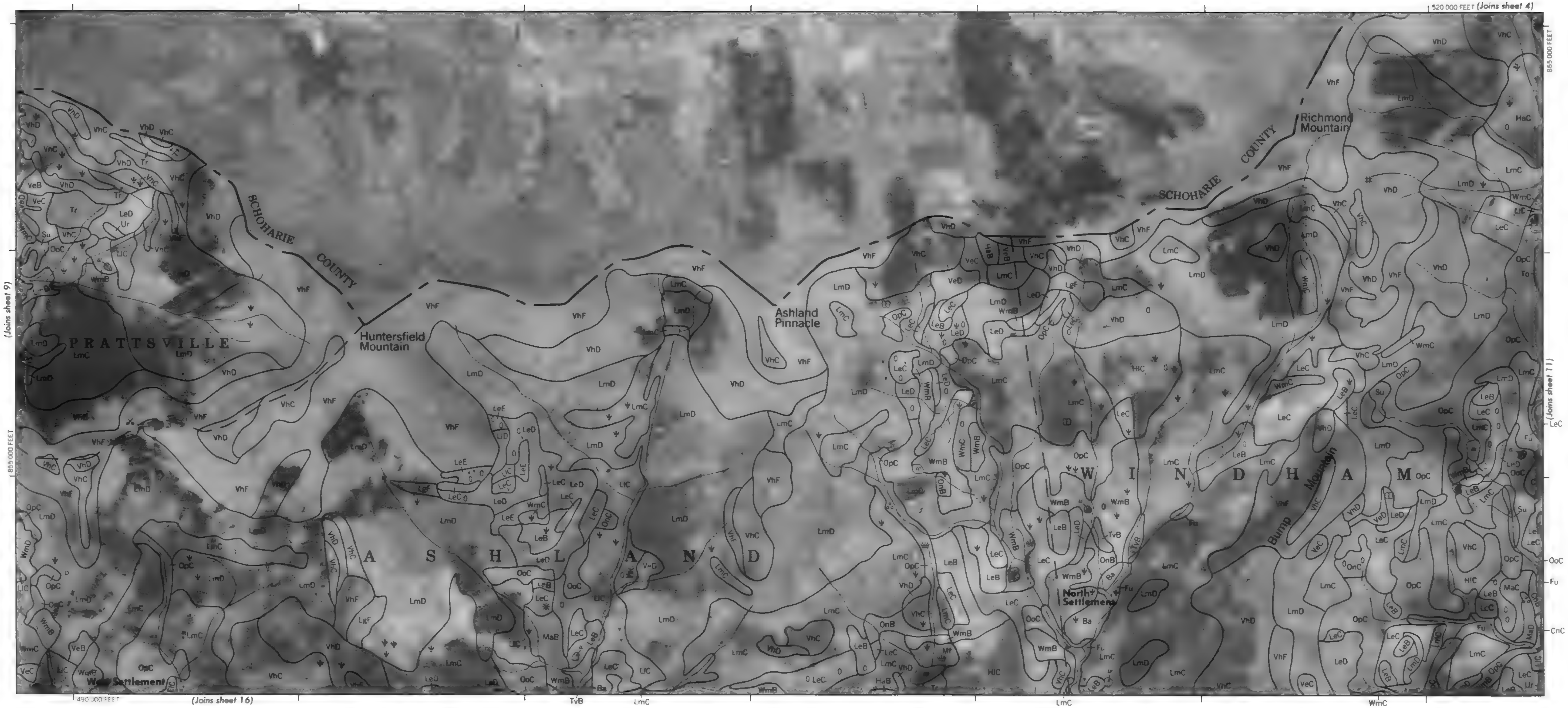
1 0.5 0 1 2 KILOMETERS

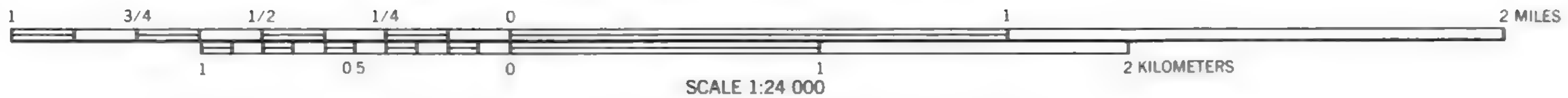
SCALE 1:24 000


9
N
455 000 FEET
865 000 FEET
SCHOHARIE COUNTY
DELAWARE COUNTY
water
P R A T T S V I L L E
A S H L A N D
Huntersfield Creek
858 000 FEET (Joins sheet 10)
TuC (Joins sheet 15)
485 000 FEET
1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

10

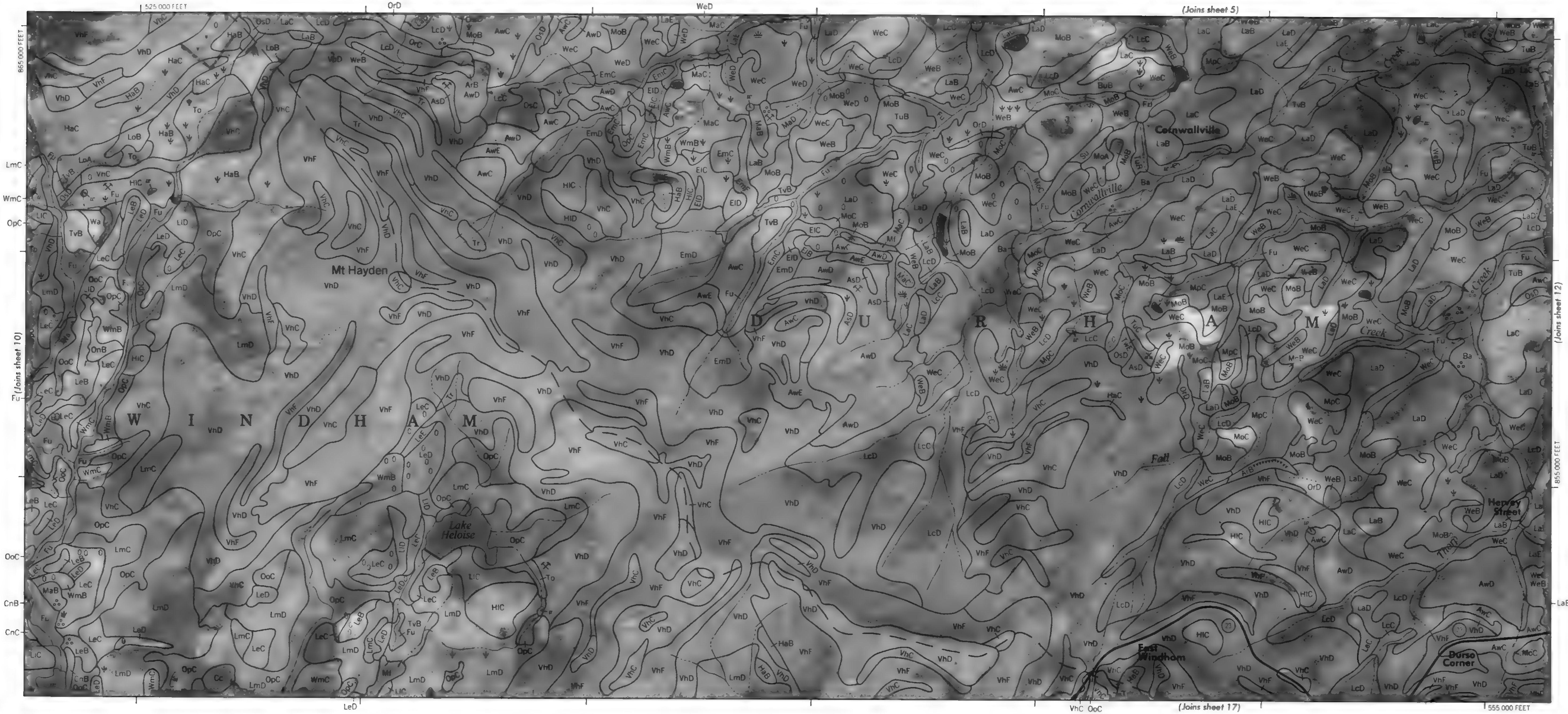
N


520 000 FEET (Joins sheet 4)
865 000 FEET
(Joins sheet 9)
(Joins sheet 11)
855 000 FEET
490 000 FEET
(Joins sheet 16)
SCHOHARIE COUNTY
SCHOHARIE COUNTY
Richmond Mountain
Huntersfield Mountain
Ashland Pinnacle
PRATTSVILLE
ASHLAND
WINDHAM
Bump Mountain
North Settlement
West Settlement


1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

11

N



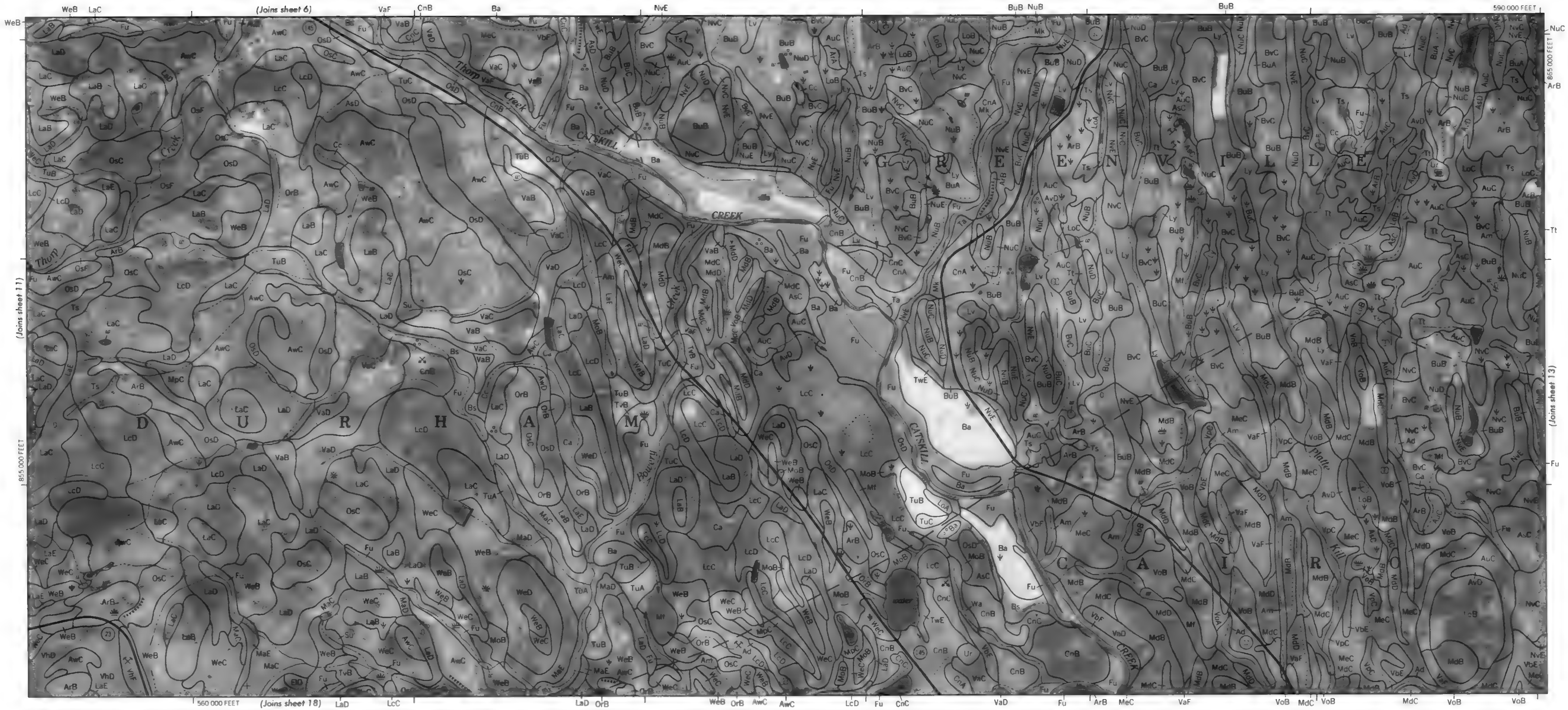
1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

SOIL SURVEY OF GREENE COUNTY, NEW YORK — SHEET NUMBER 12

N



1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

13

N

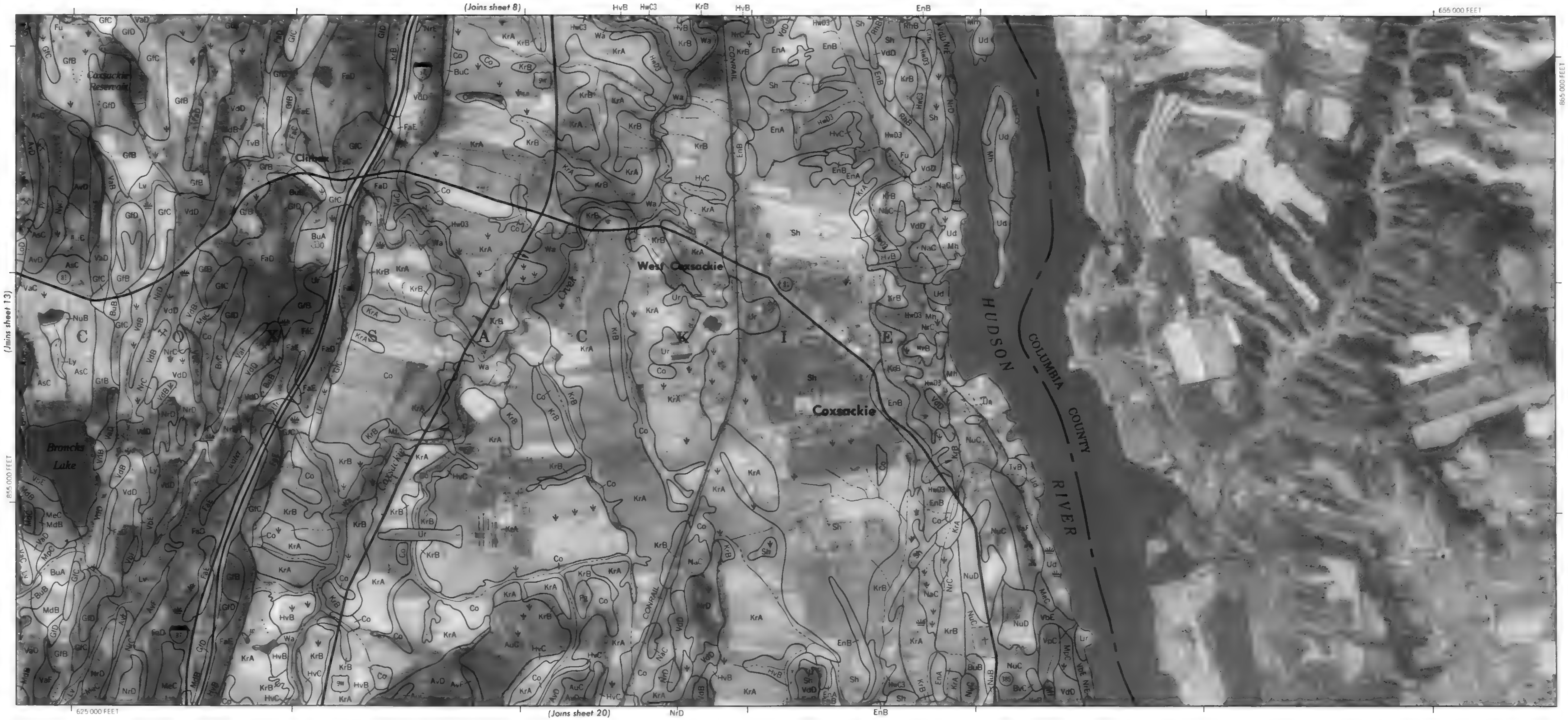
1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

14

N



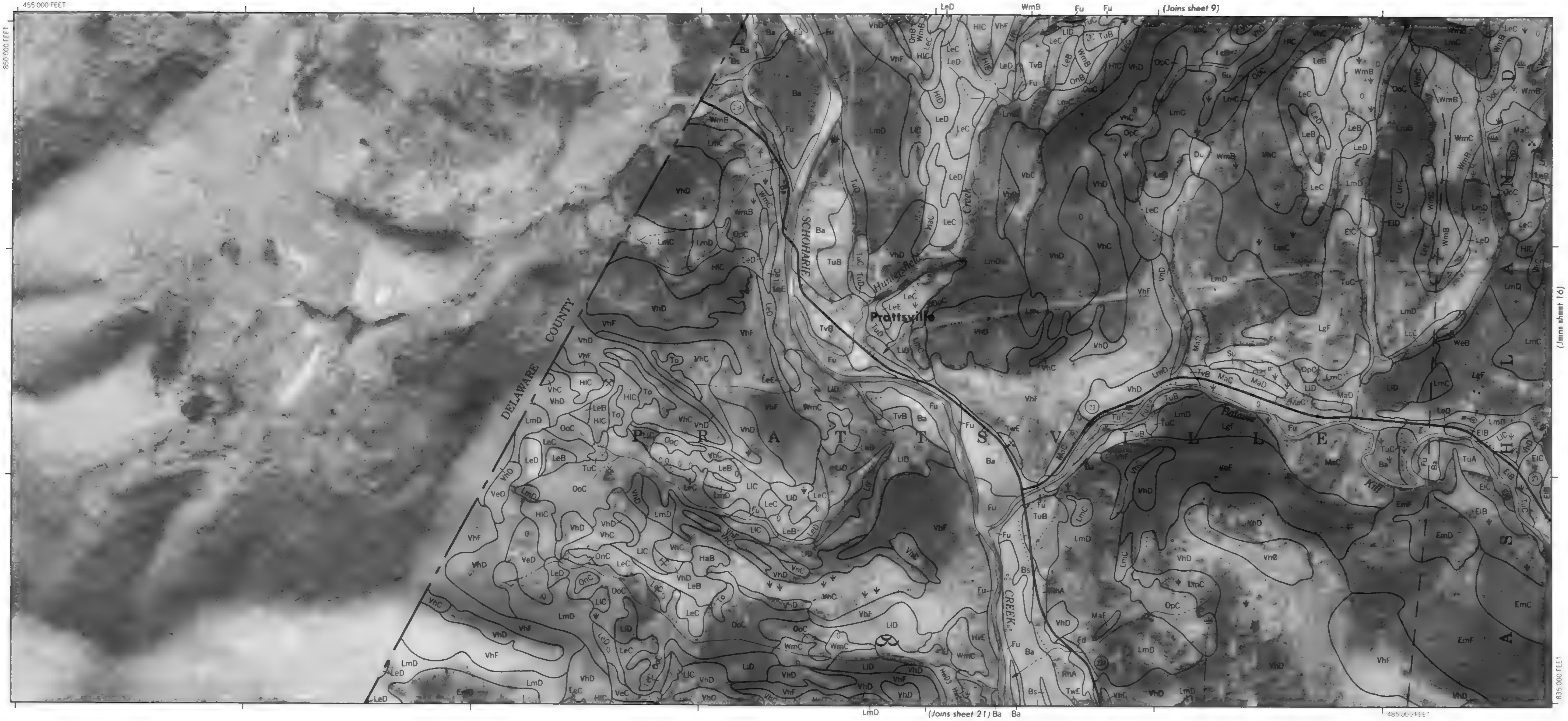
1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

15

N



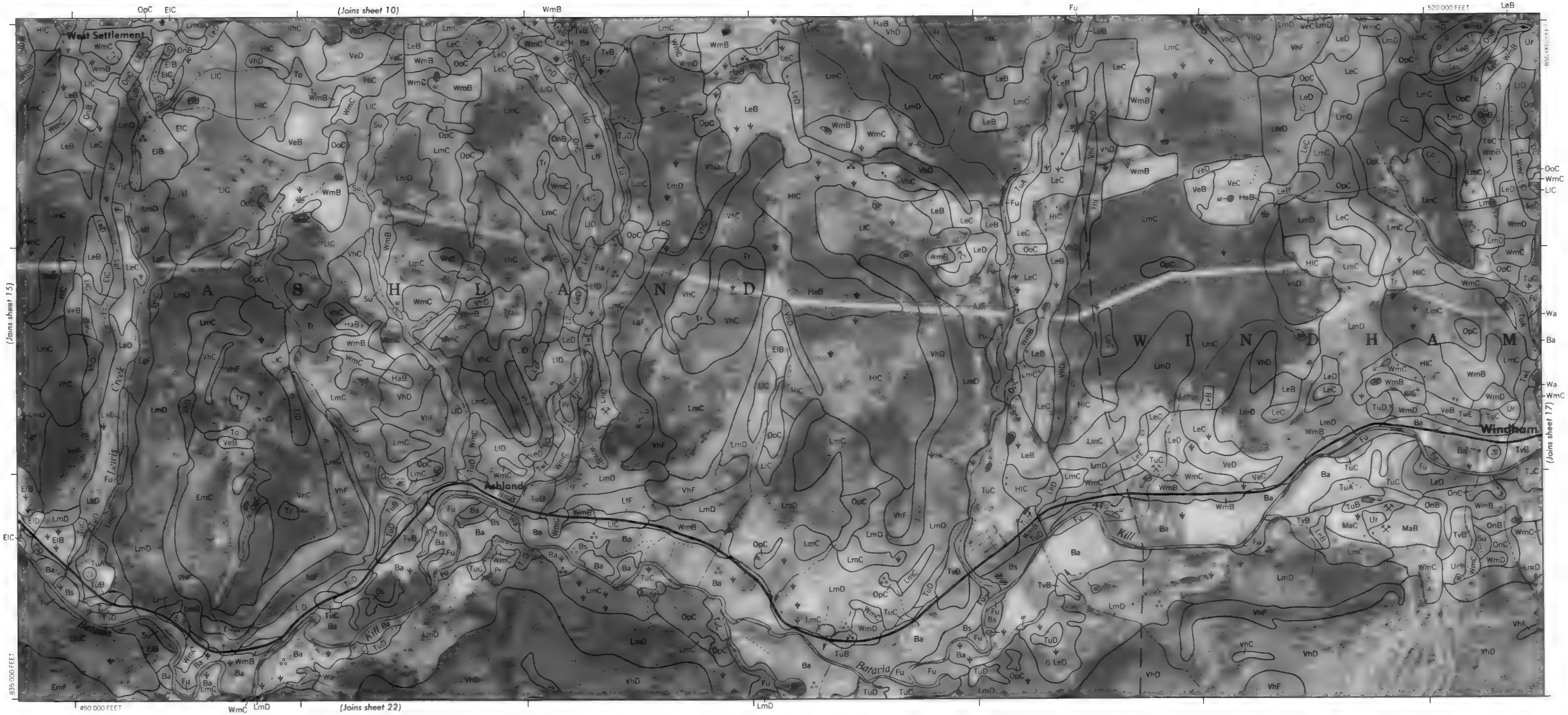
1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

16

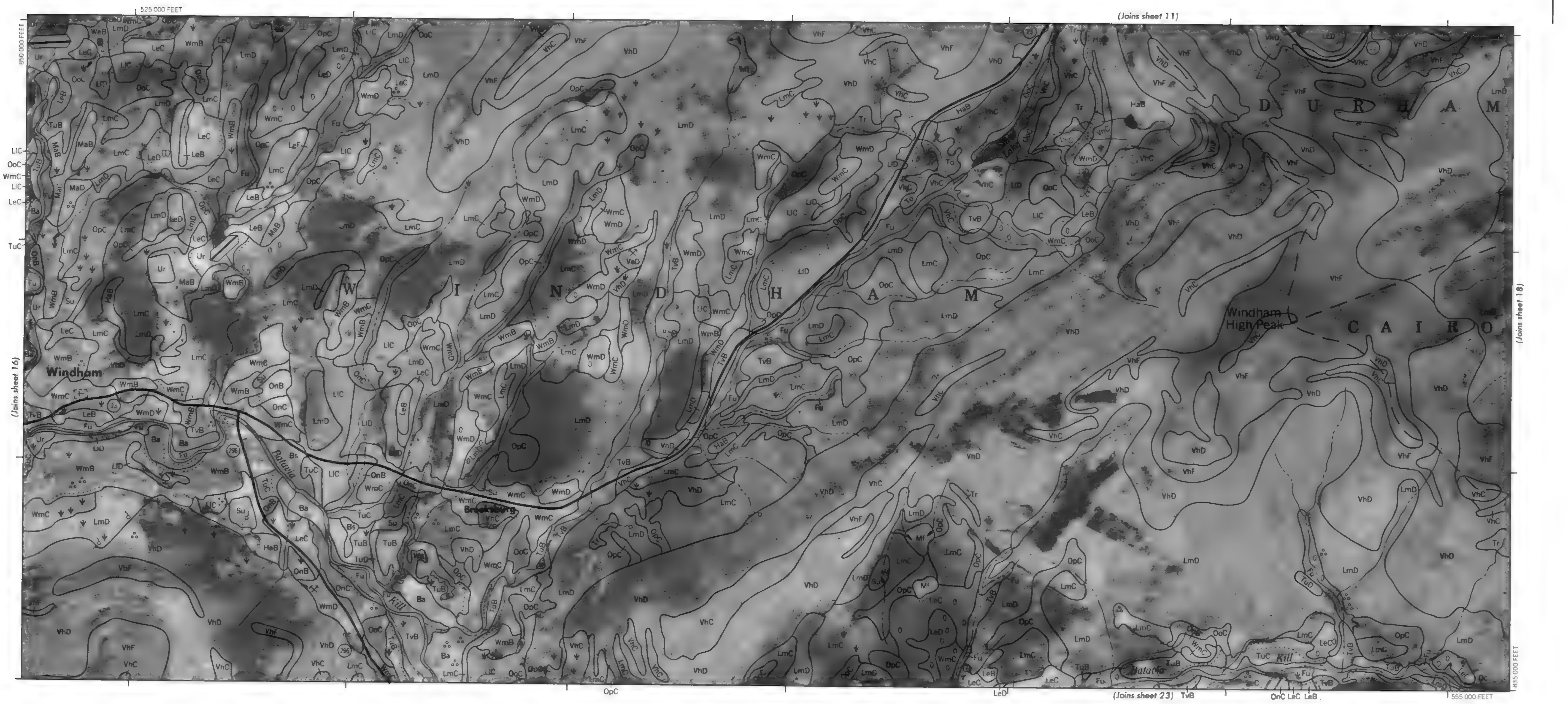
N



1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

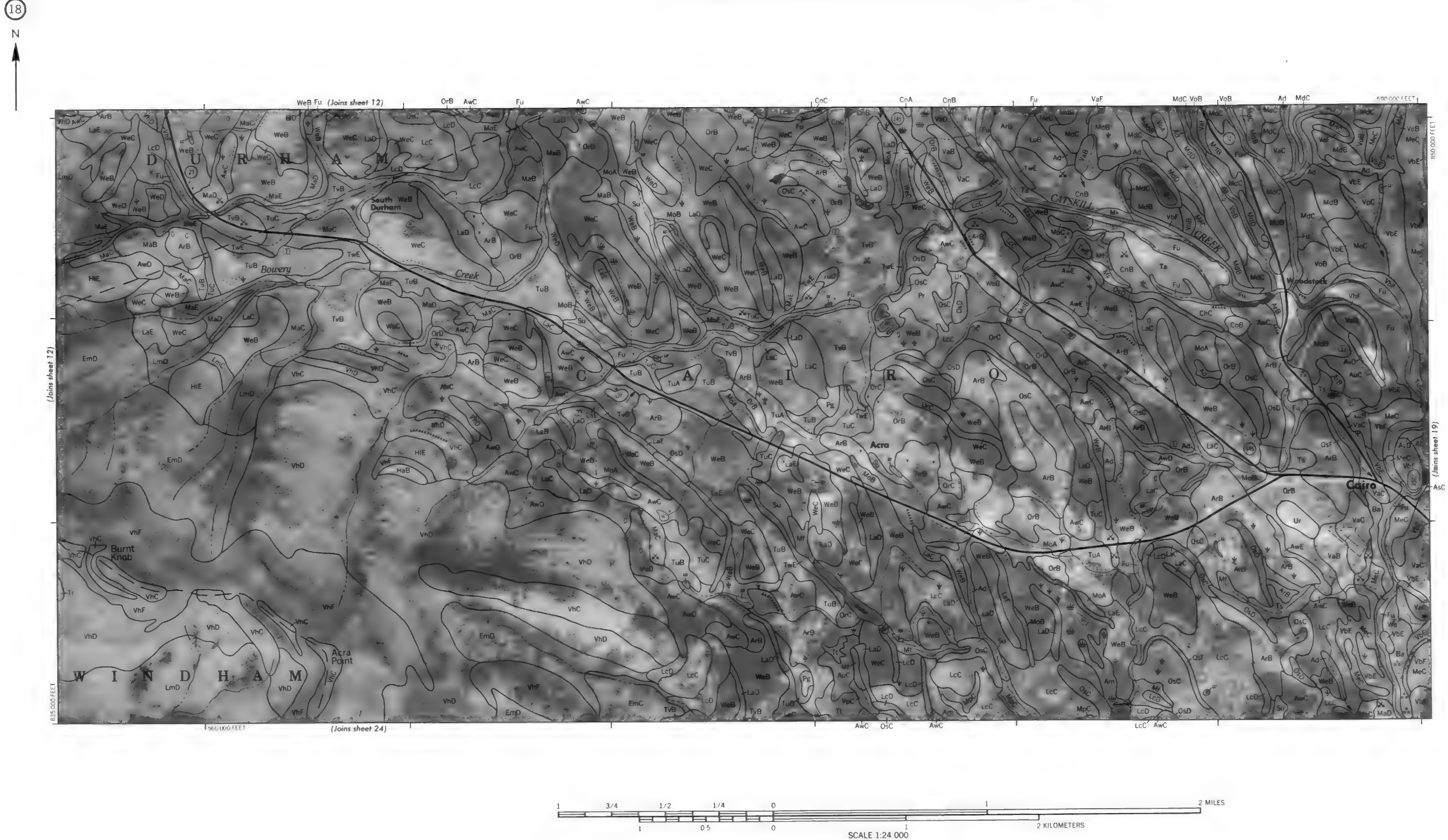
SCALE 1:24 000



1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000


18
N
(Joins sheet 12)
(Joins sheet 12)
(Joins sheet 19)
(Joins sheet 24)
D U R H A M
South Durham
Bowery Creek
C A I R O
Acra
CATSKILL CREEK
Woodstock
Cairo
Burnt Knob
Acra Point
W I N D H A M
850 000 FEET
835 000 FEET
560 000 FEET
590 000 FEET
1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

N

1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

20

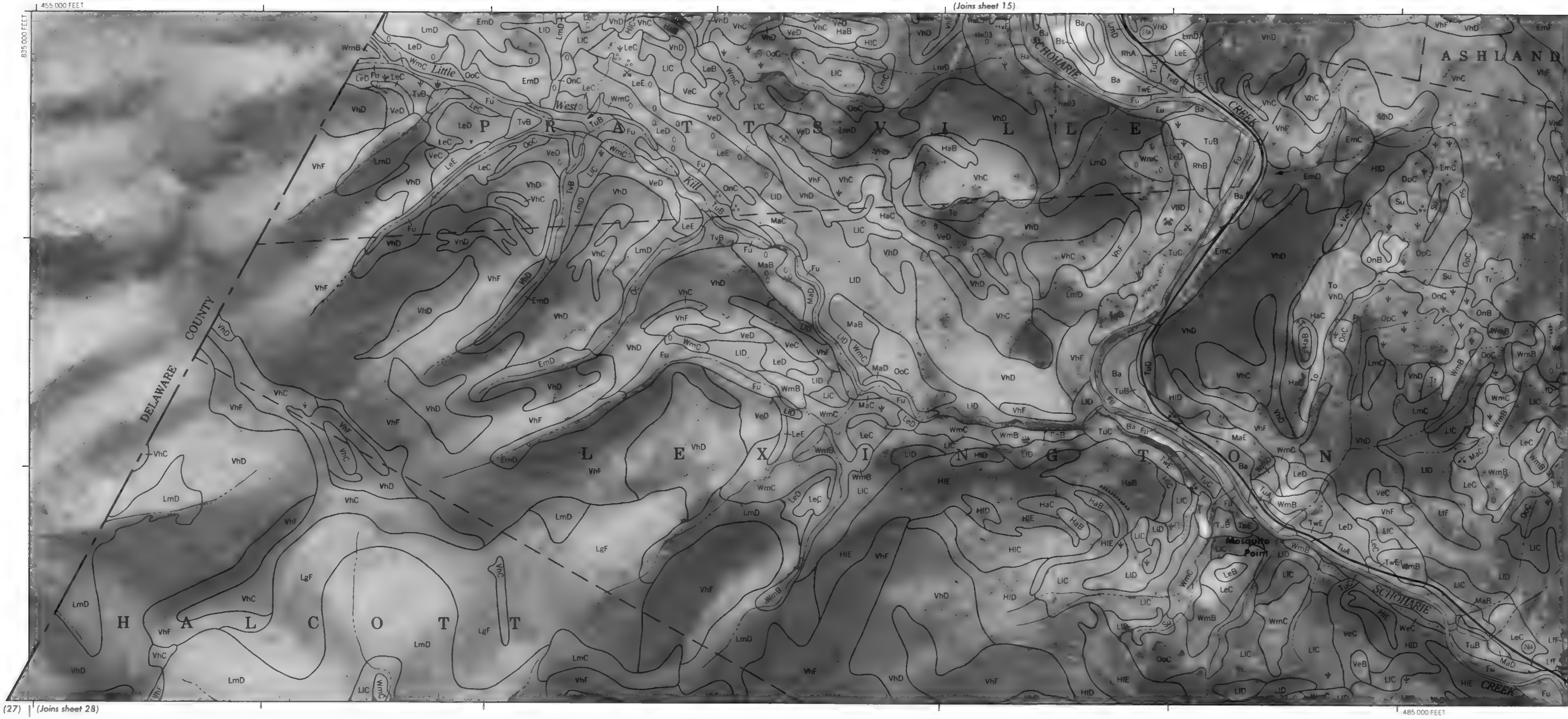
N

1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

N



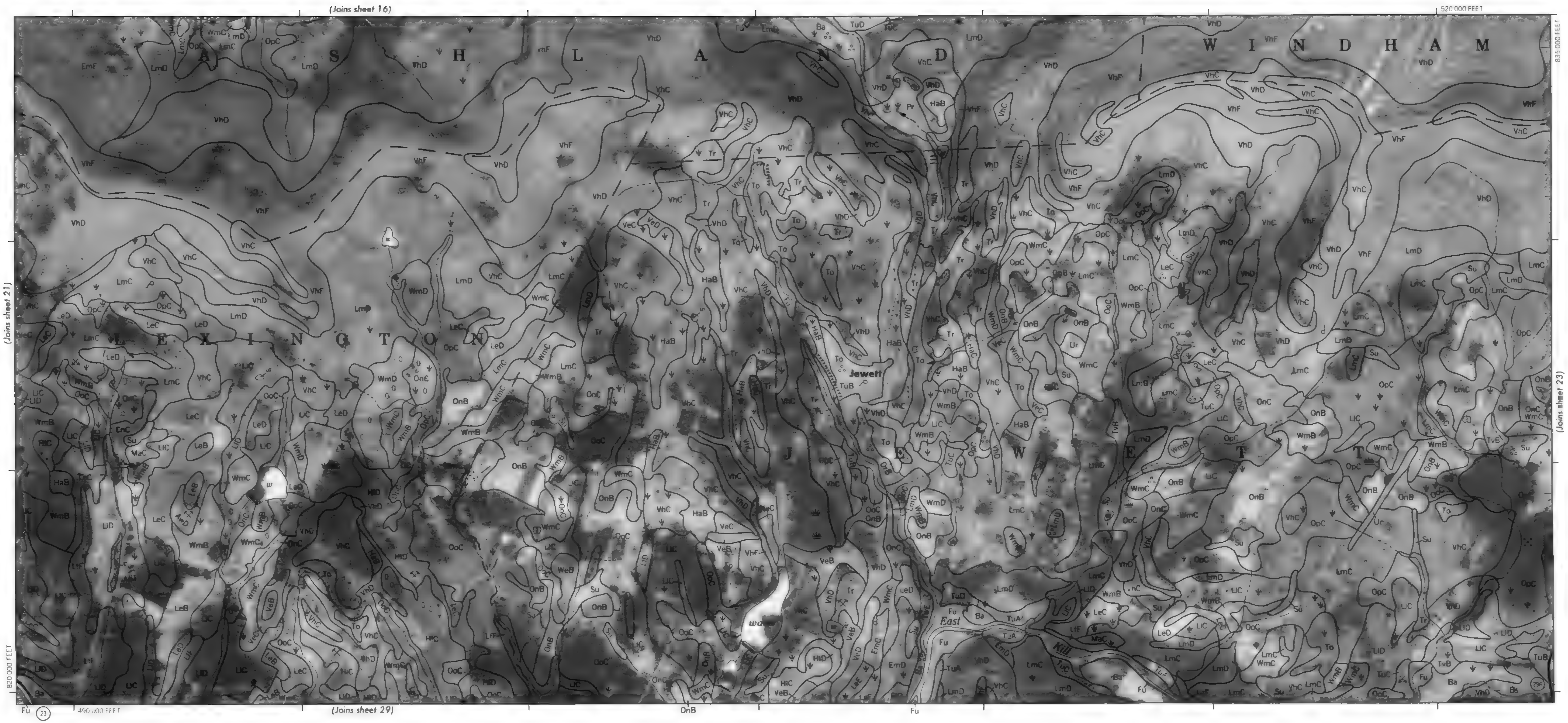
1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

22

N



1 3/4 1/2 1/4 0 1 2 MILES

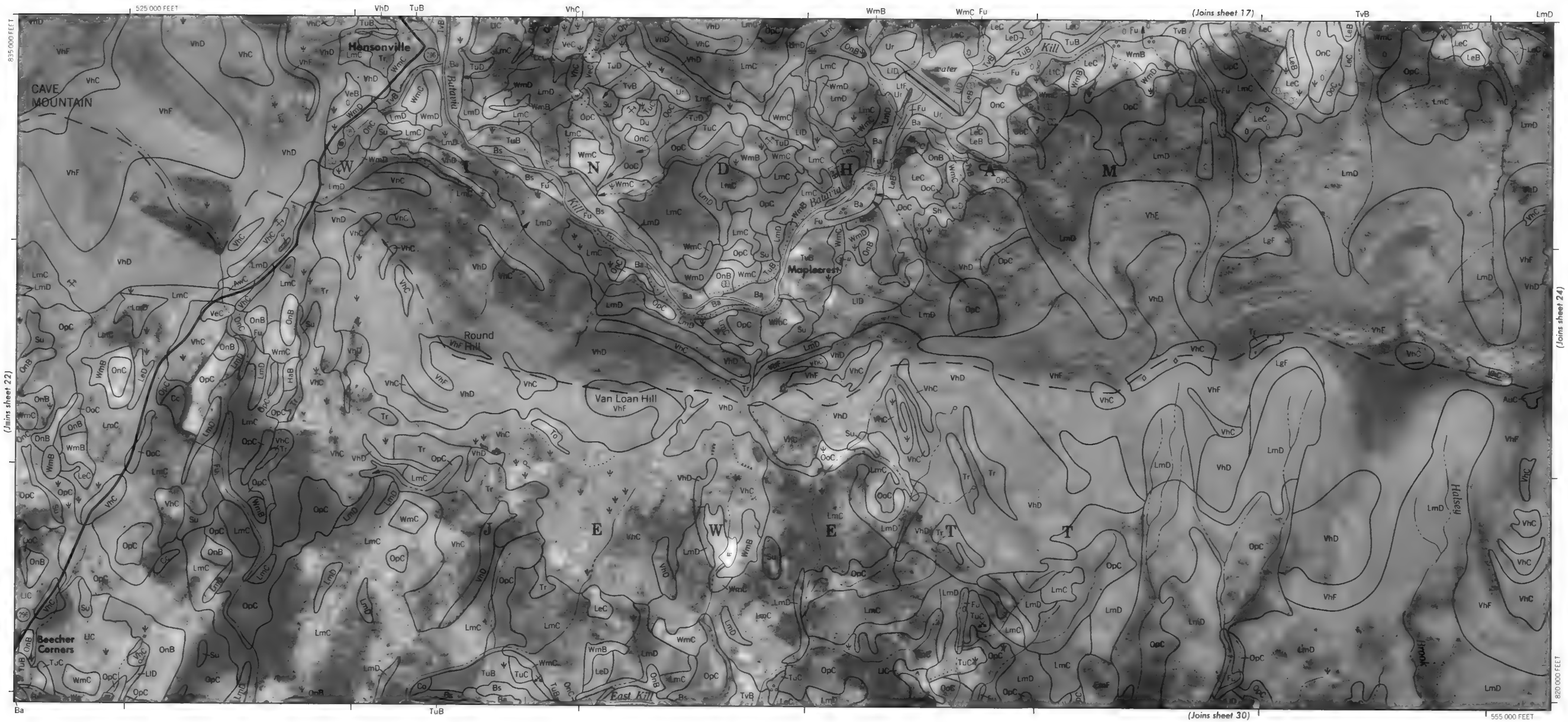
1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

SOIL SURVEY OF GREENE COUNTY, NEW YORK — SHEET NUMBER 23

23

N



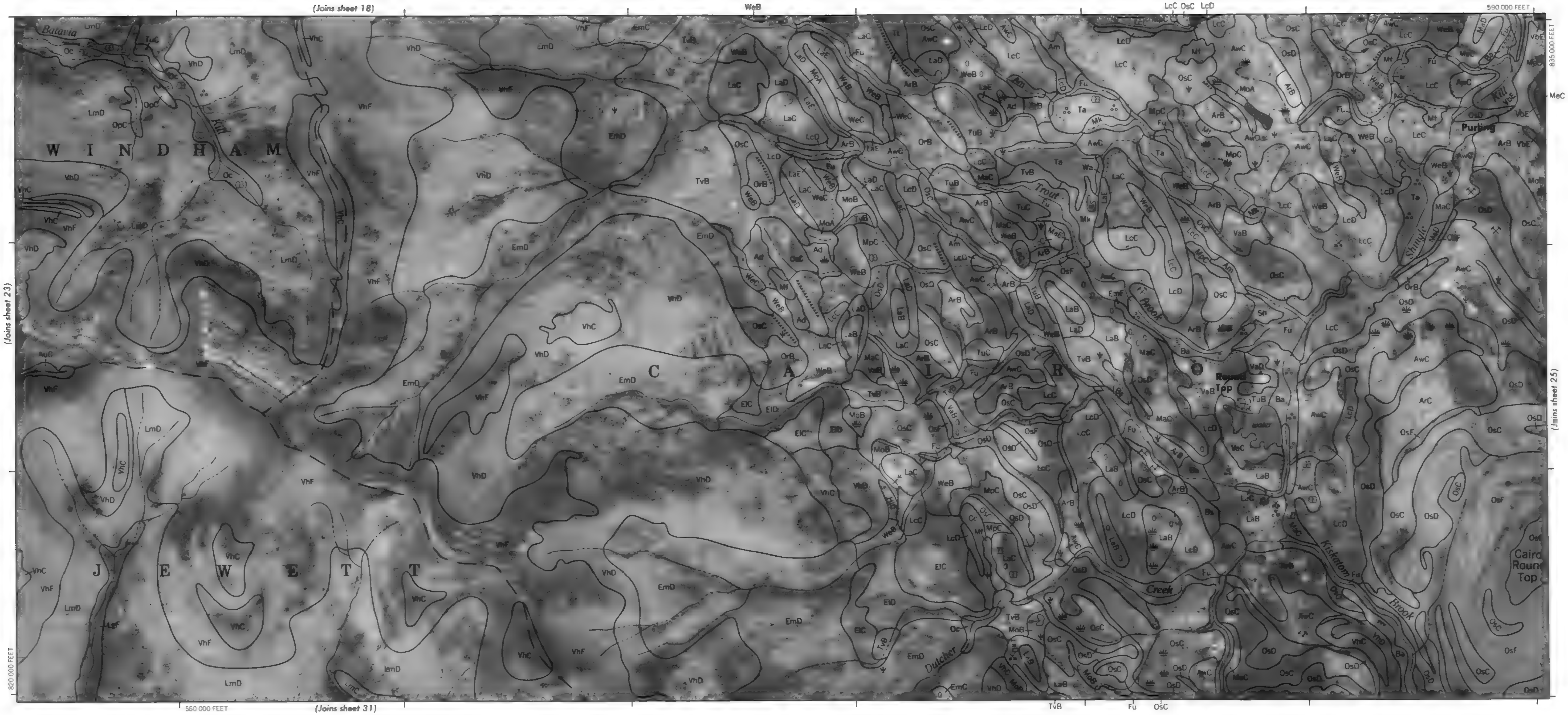
1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

24

N



1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

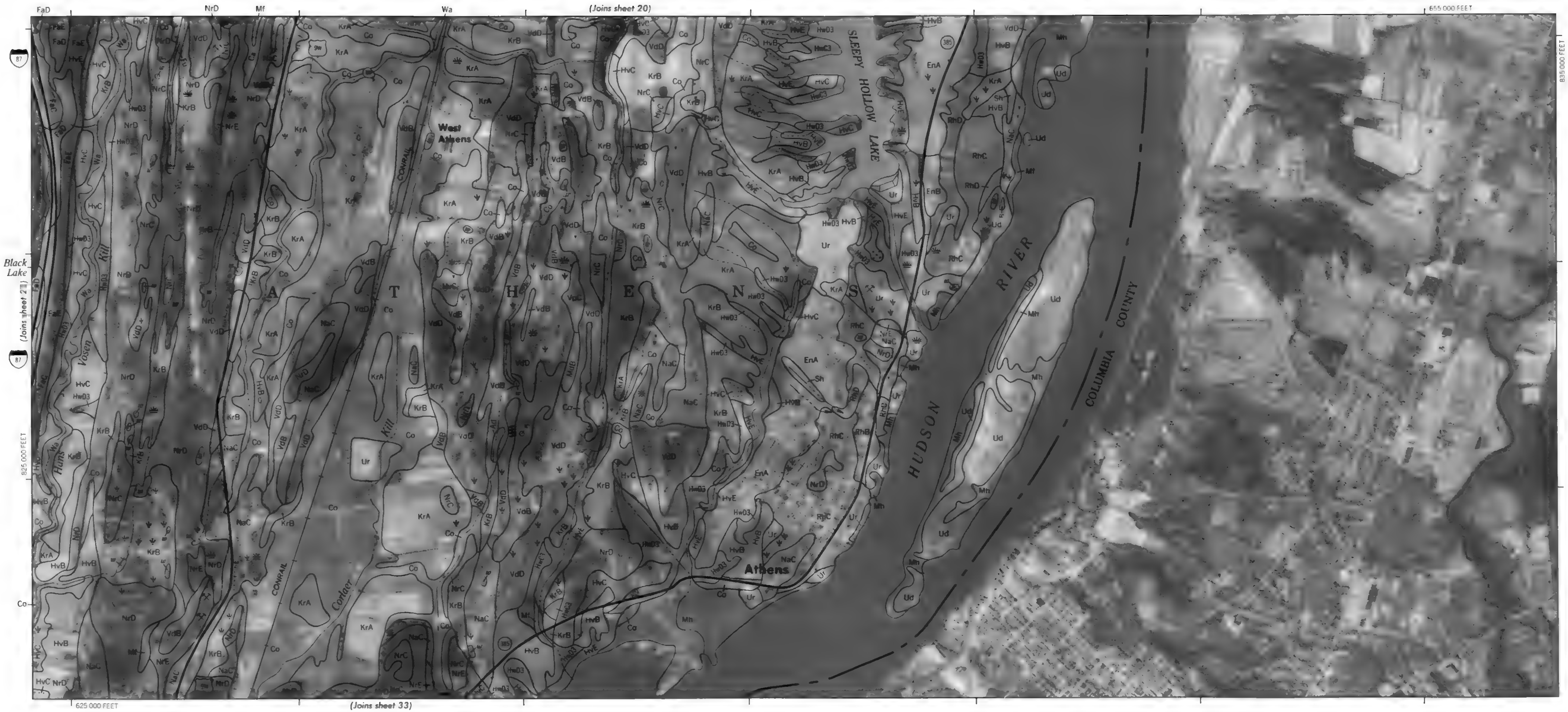
1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

26

N

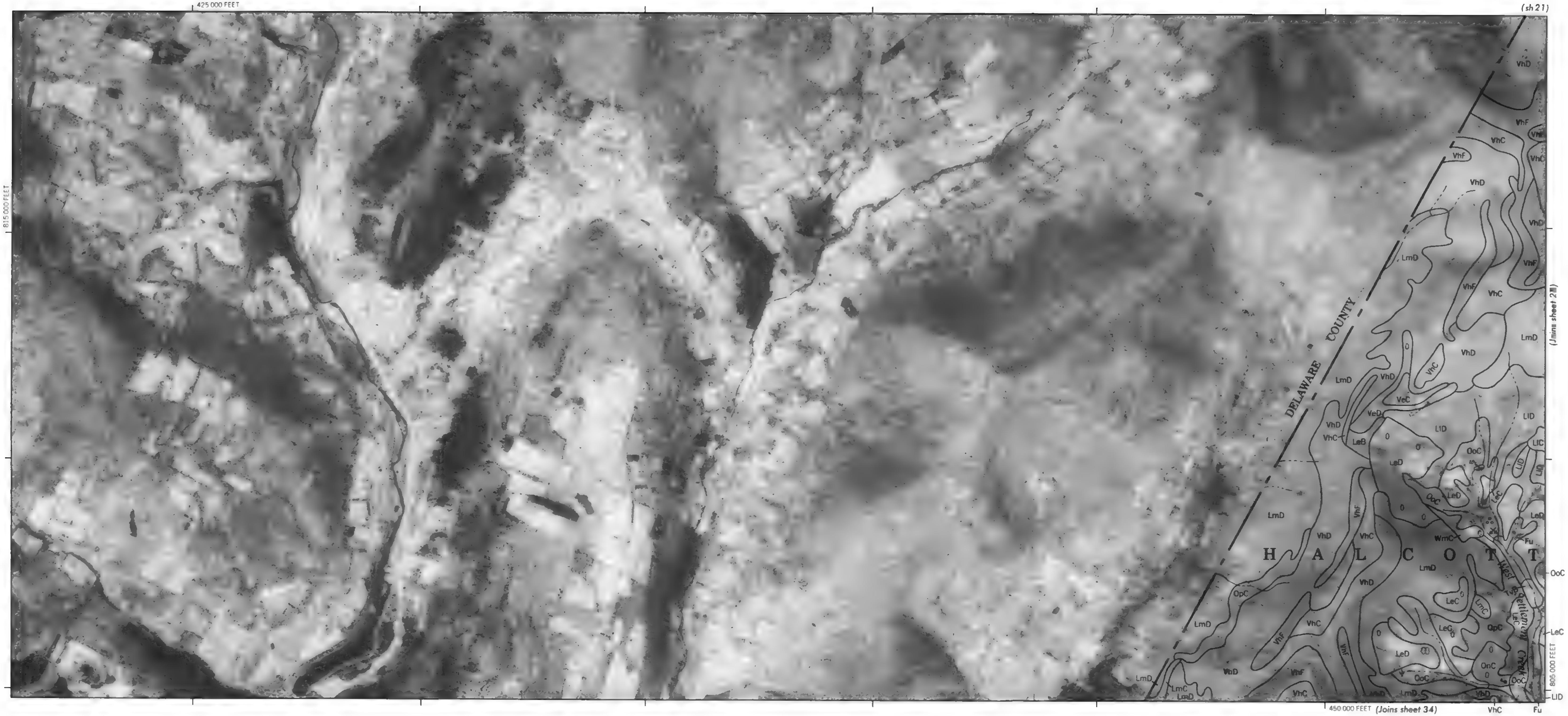


1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

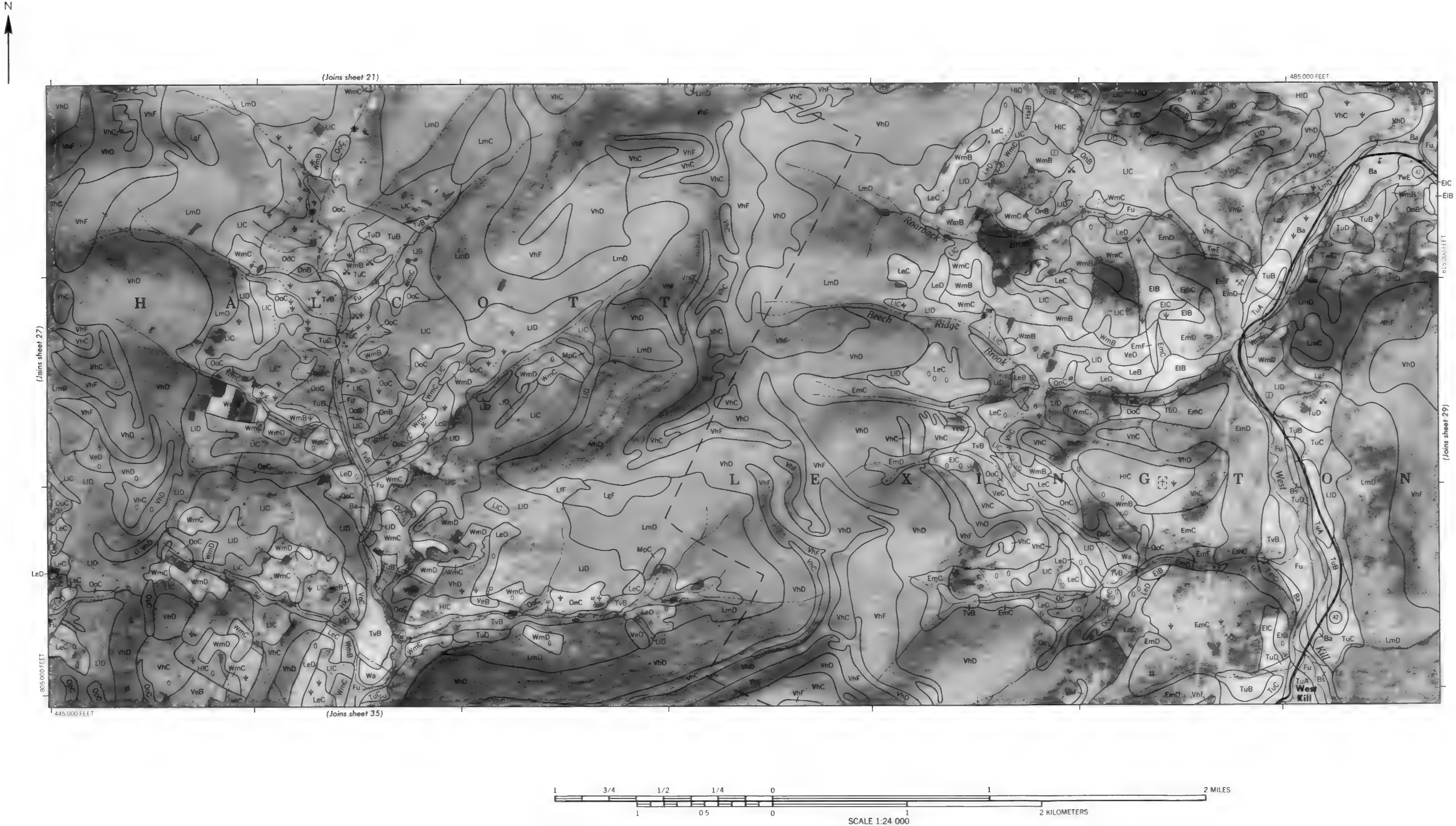
N



1 3/4 1/2 1/4 0 1 2 MILES

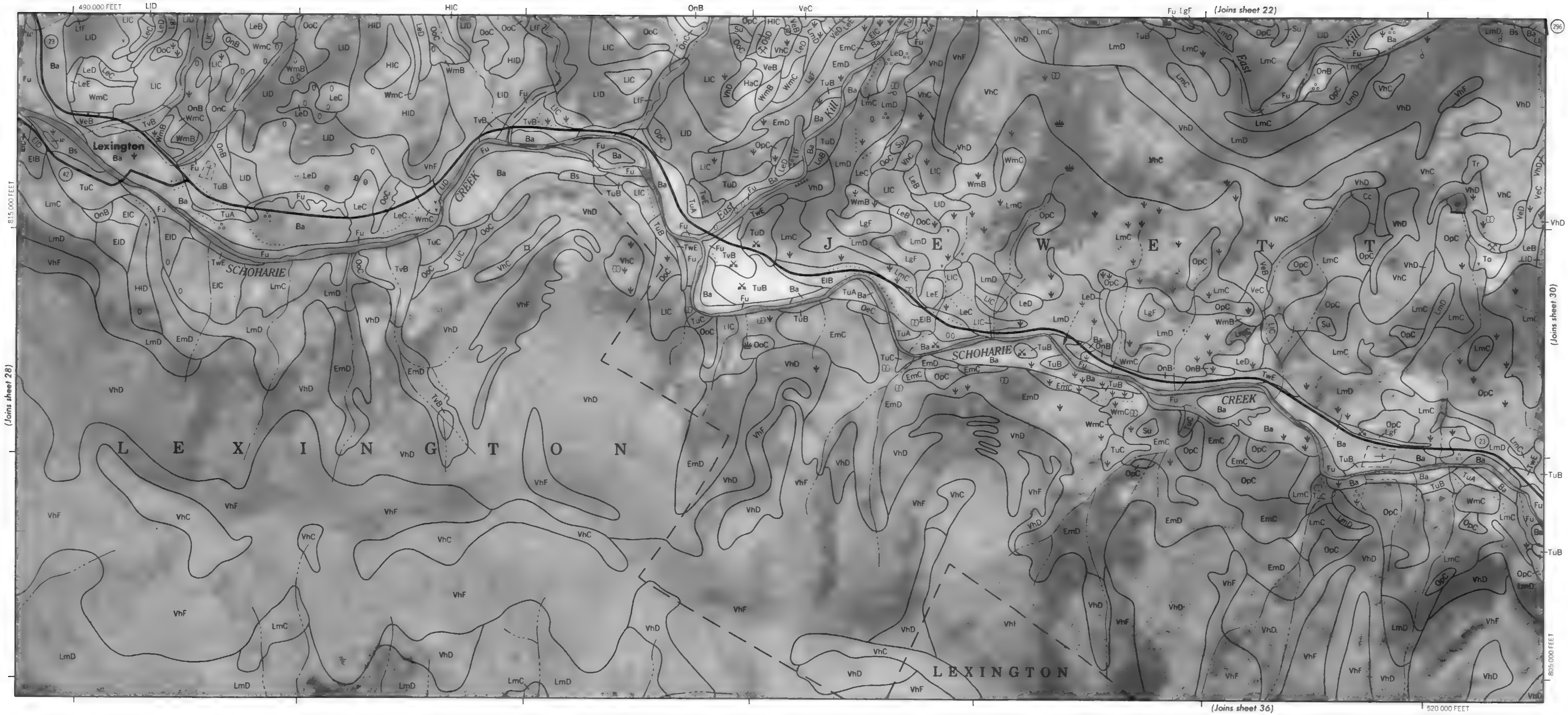
1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000


N
(Joins sheet 21)
(Joins sheet 27)
(Joins sheet 29)
(Joins sheet 35)
485 000 FEET
445 000 FEET
805 000 FEET
H A L C O T T
L E X I N G T O N
Roarback Brook
Beech Ridge Brook
West Kill
West Kill
1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

29

N

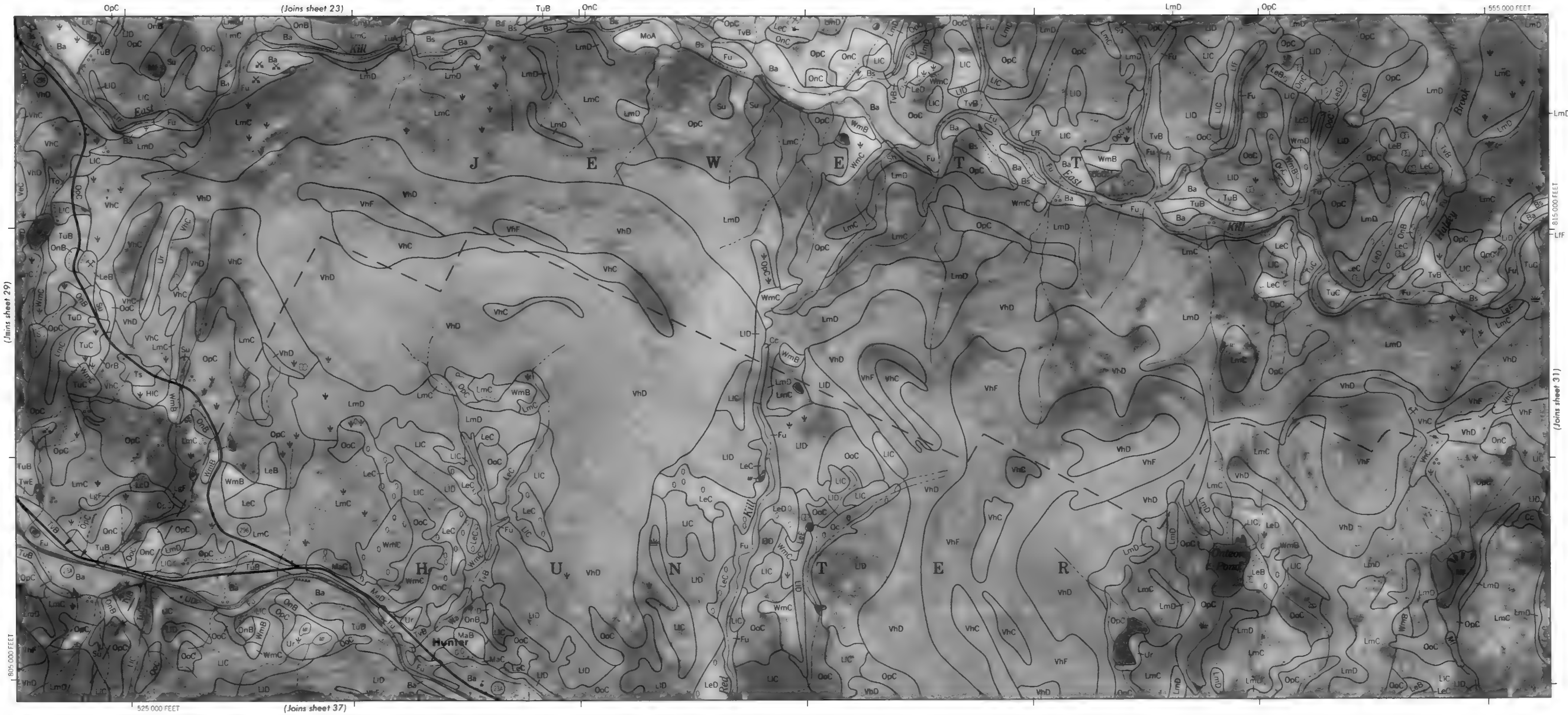


1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

N



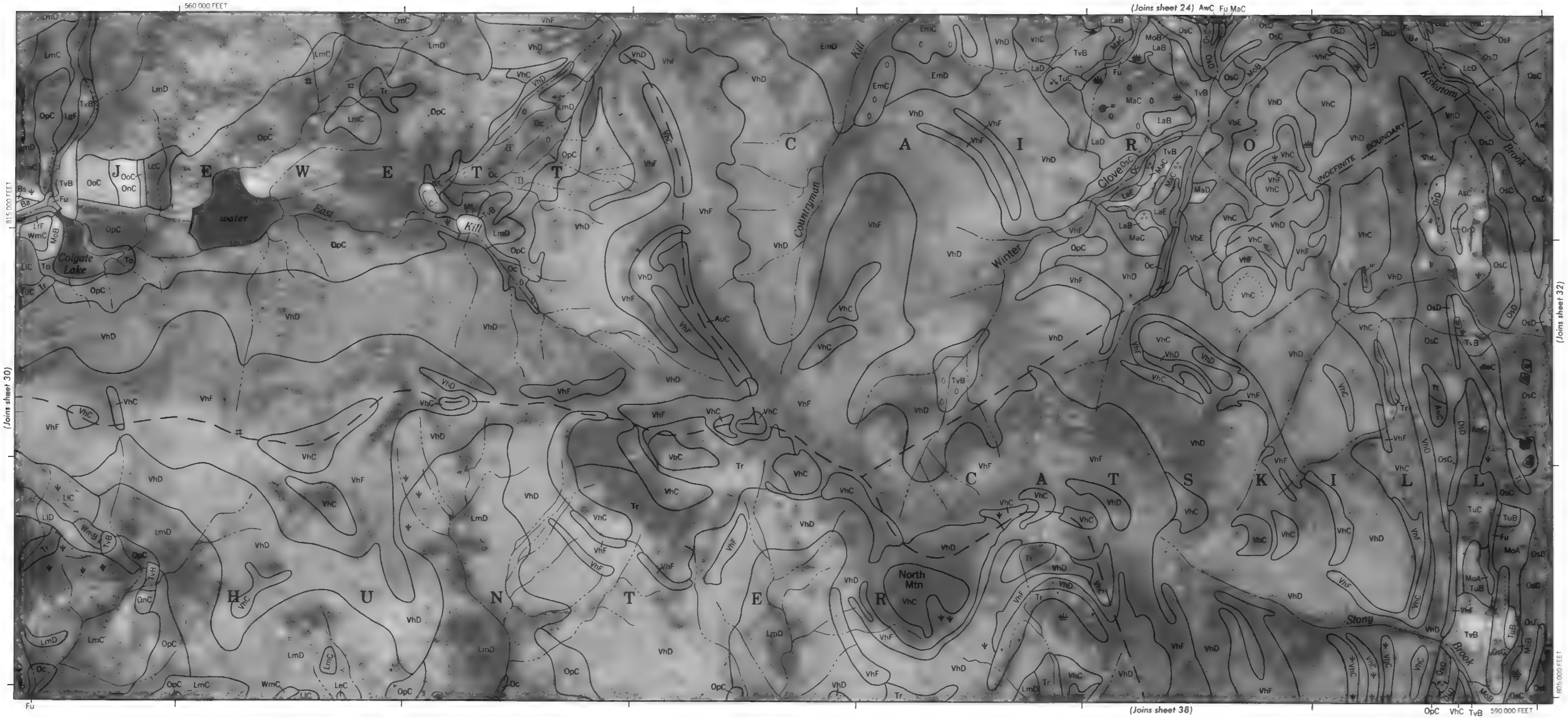
1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

31

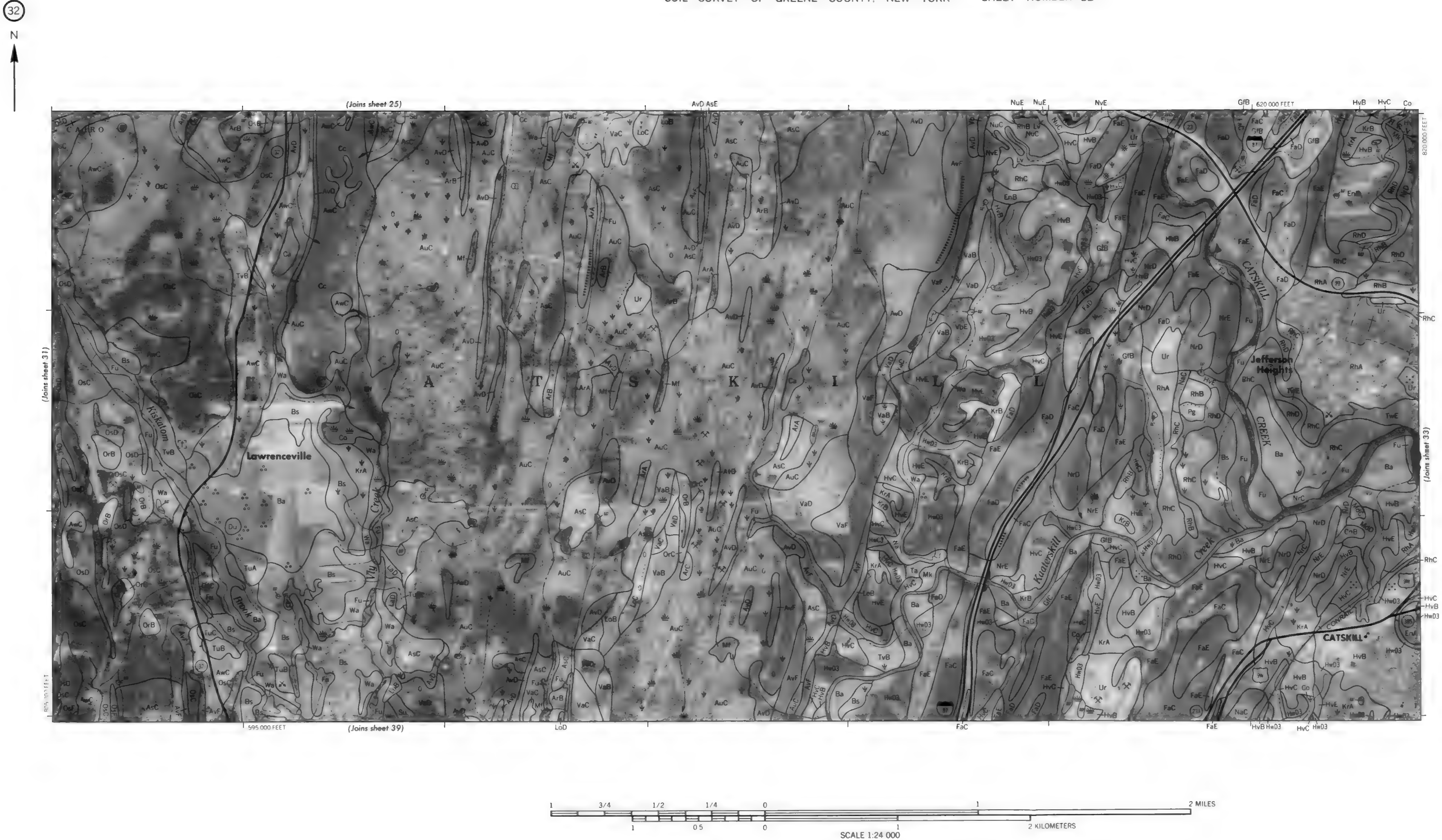
N



1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

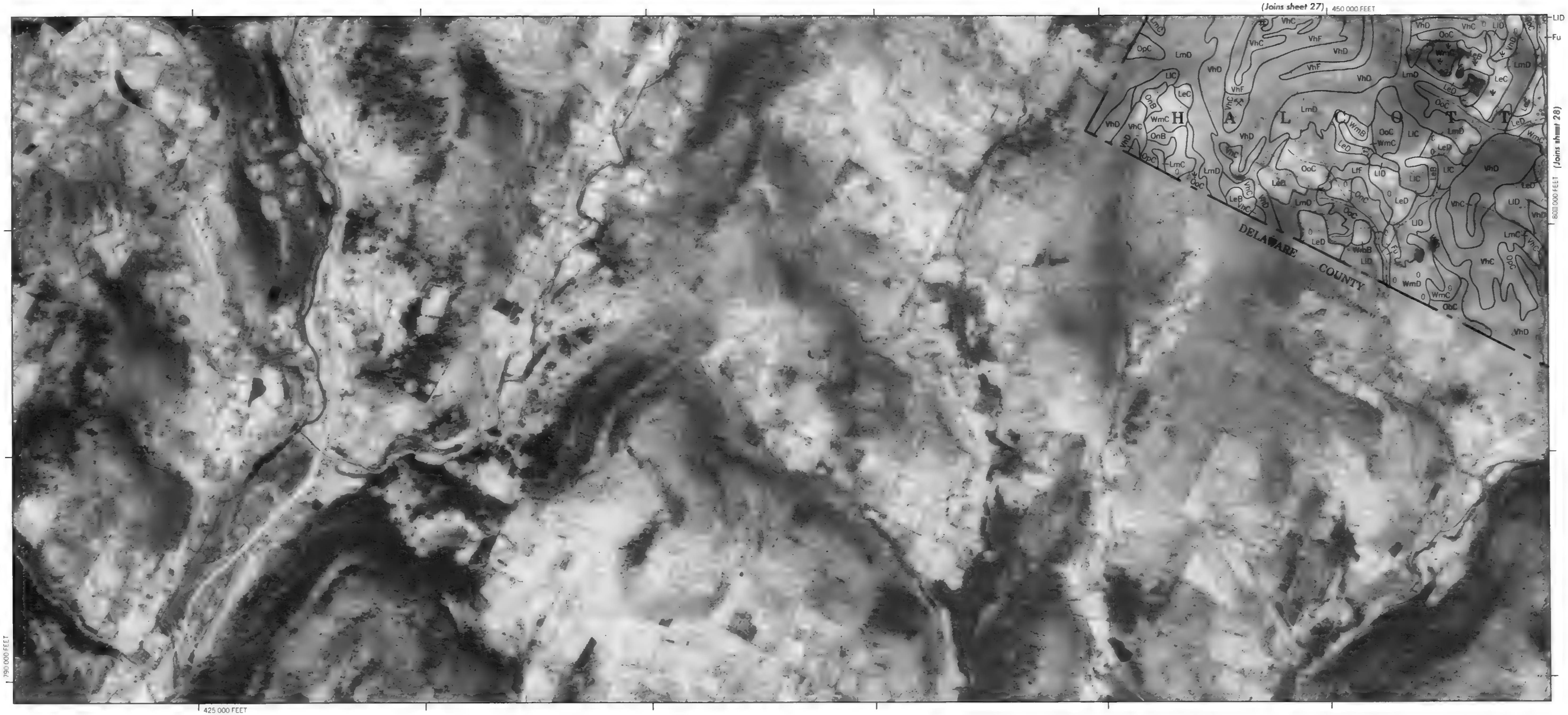
SCALE 1:24 000


32
N
(Joins sheet 25)
(Joins sheet 39)
(Joins sheet 31)
(Joins sheet 33)
CAIRO
Lawrenceville
Kiskatom Brook
Vly Creek
C A T S K I L L
Jefferson Heights
CATSKILL CREEK
Kaaterskill Creek
CATSKILL
CONRAIL
595 000 FEET
620 000 FEET
1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000


N
(Joins sheet 26)
625 000 FEET
820 000 FEET
(Joins sheet 32)
(Joins sheet 40)
665 000 FEET
ATHENS
CATSKILL
HUDSON RIVER
COLUMBIA COUNTY
CONRAIL
CATSKILL
CREEK
Kill
1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

34

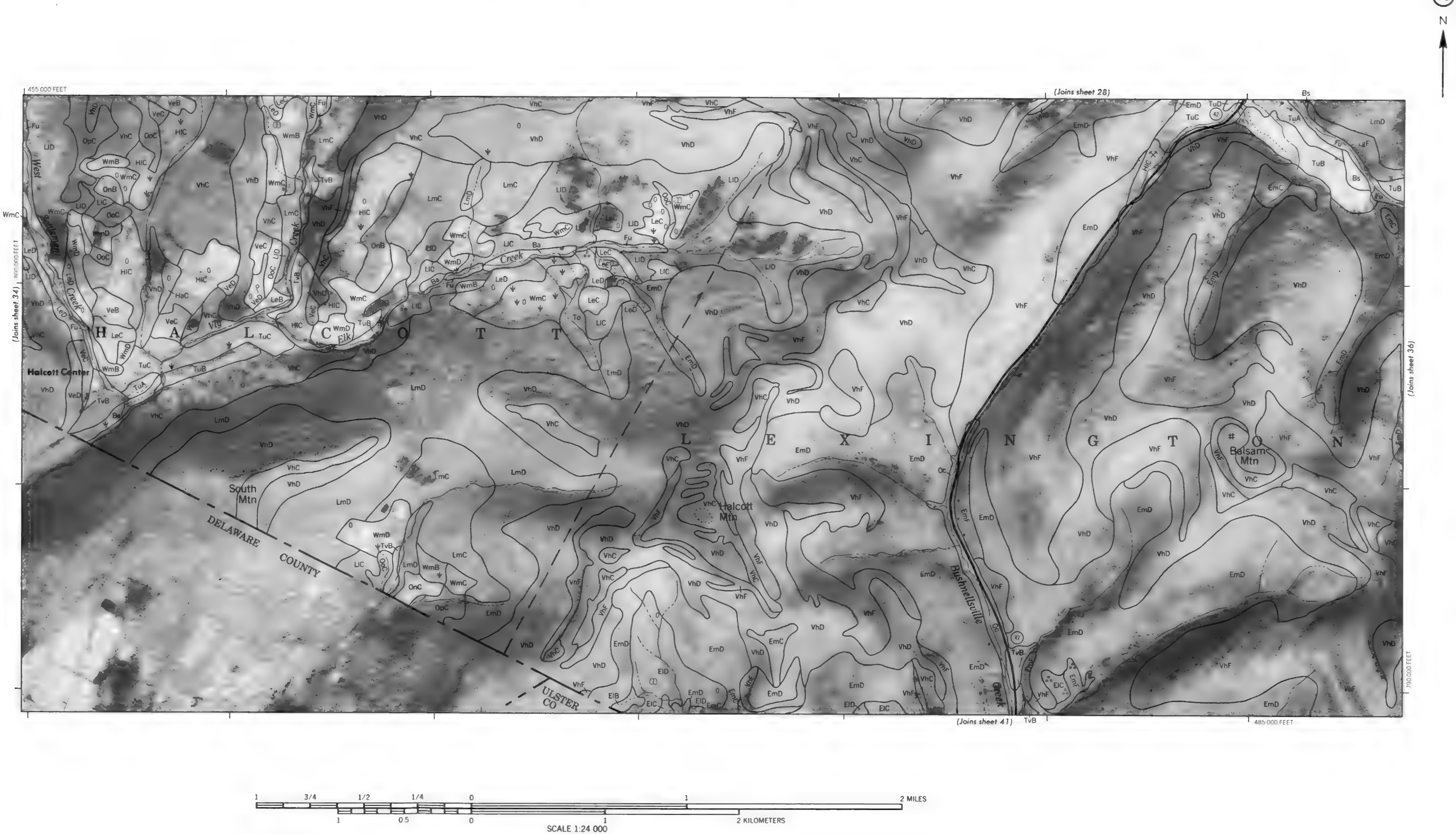
N



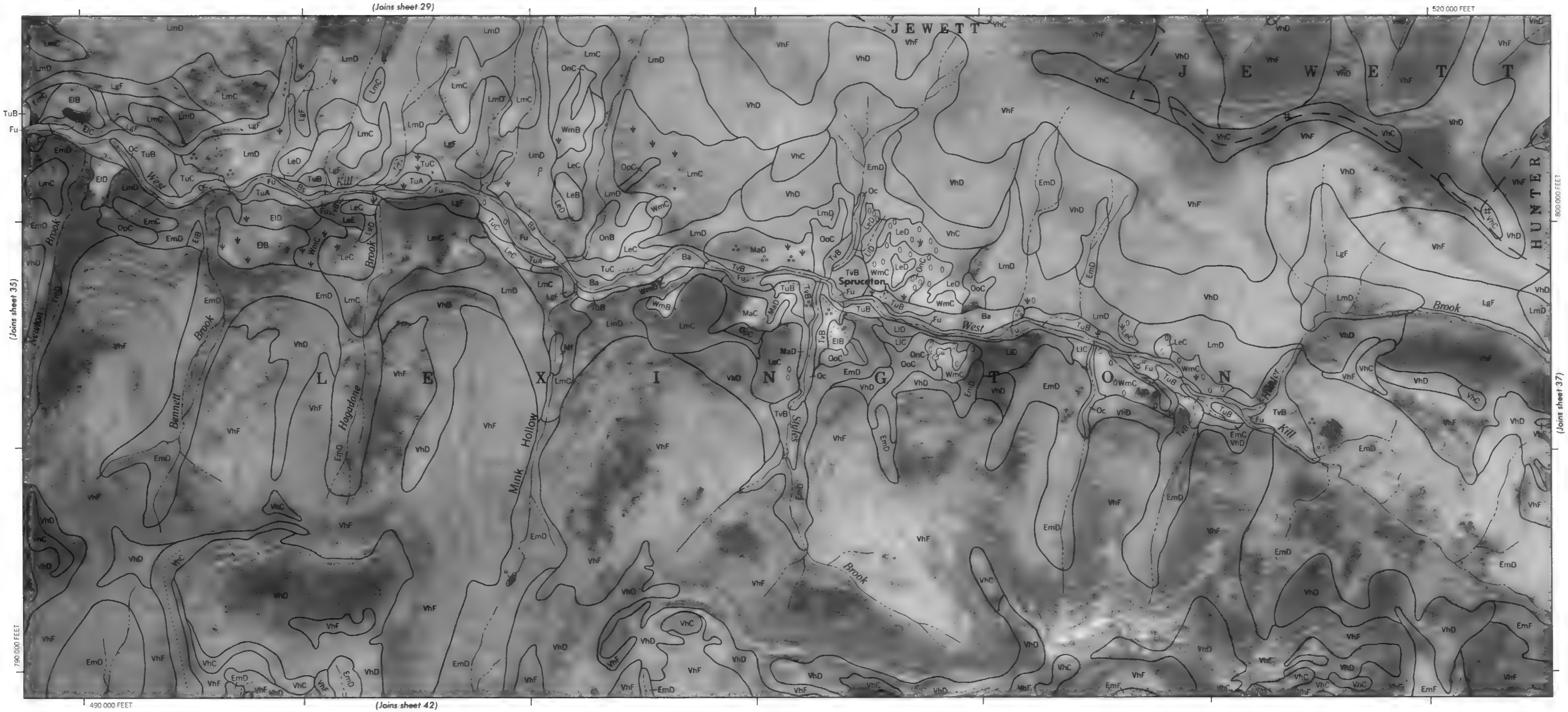
1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000


35
N
455 000 FEET
(Joins sheet 28)
(Joins sheet 34)
(Joins sheet 36)
(Joins sheet 41)
485 000 FEET
HALCOTT
LEXINGTON
Halcott Center
South Mtn
Halcott Mtn
Balsam Mtn
DELAWARE COUNTY
ULSTER CO
West Settlement Creek
Vly Creek
Elk Creek
Bushnellsville Creek
1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

N

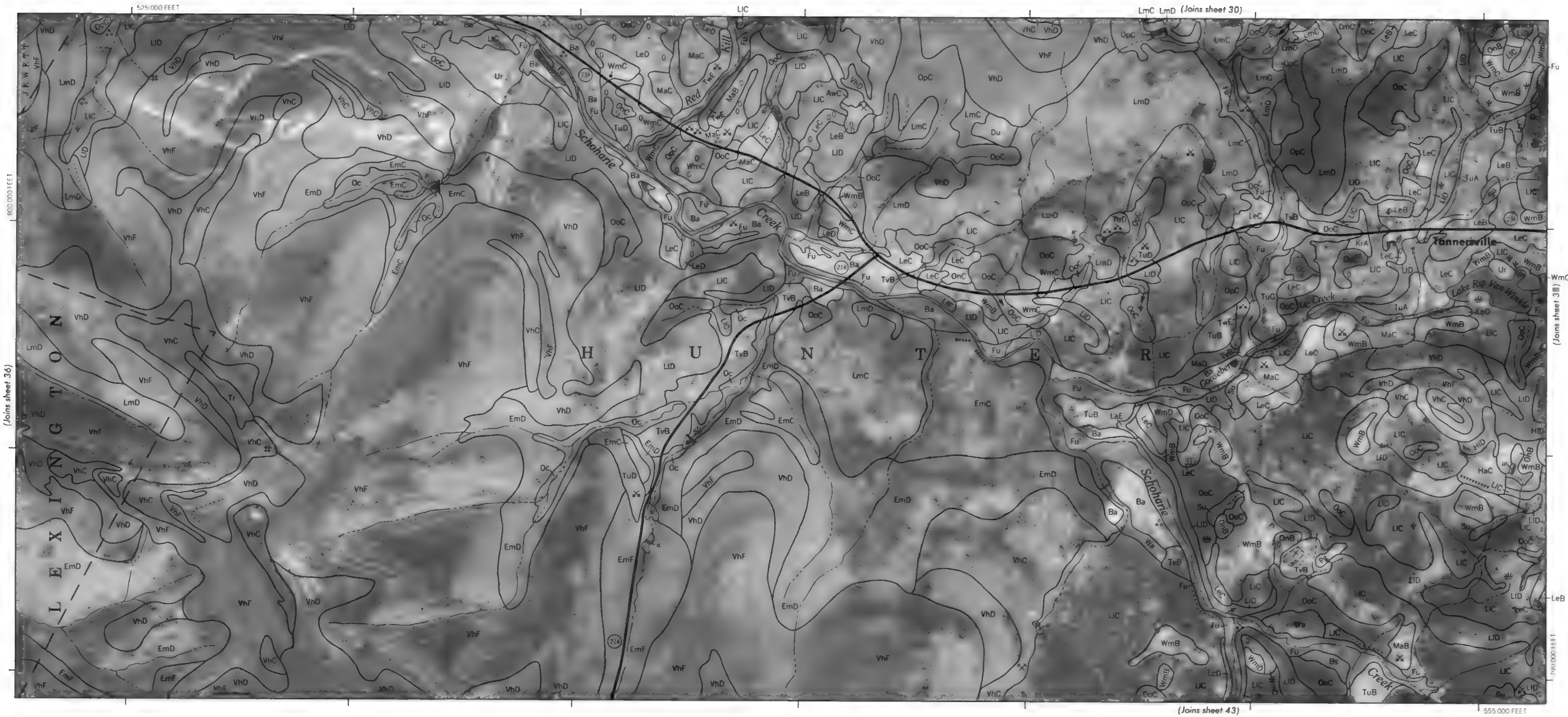


1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

N



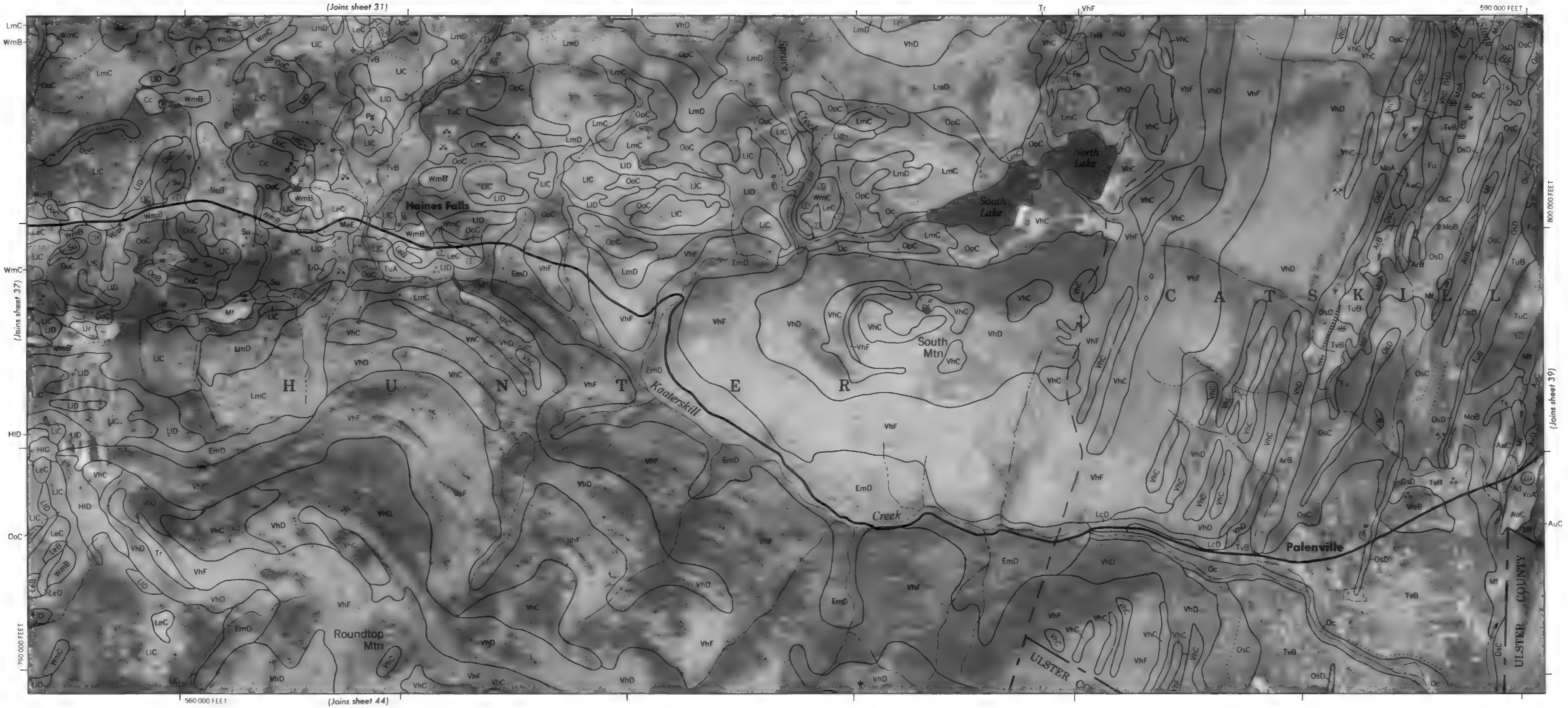
1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

38

N

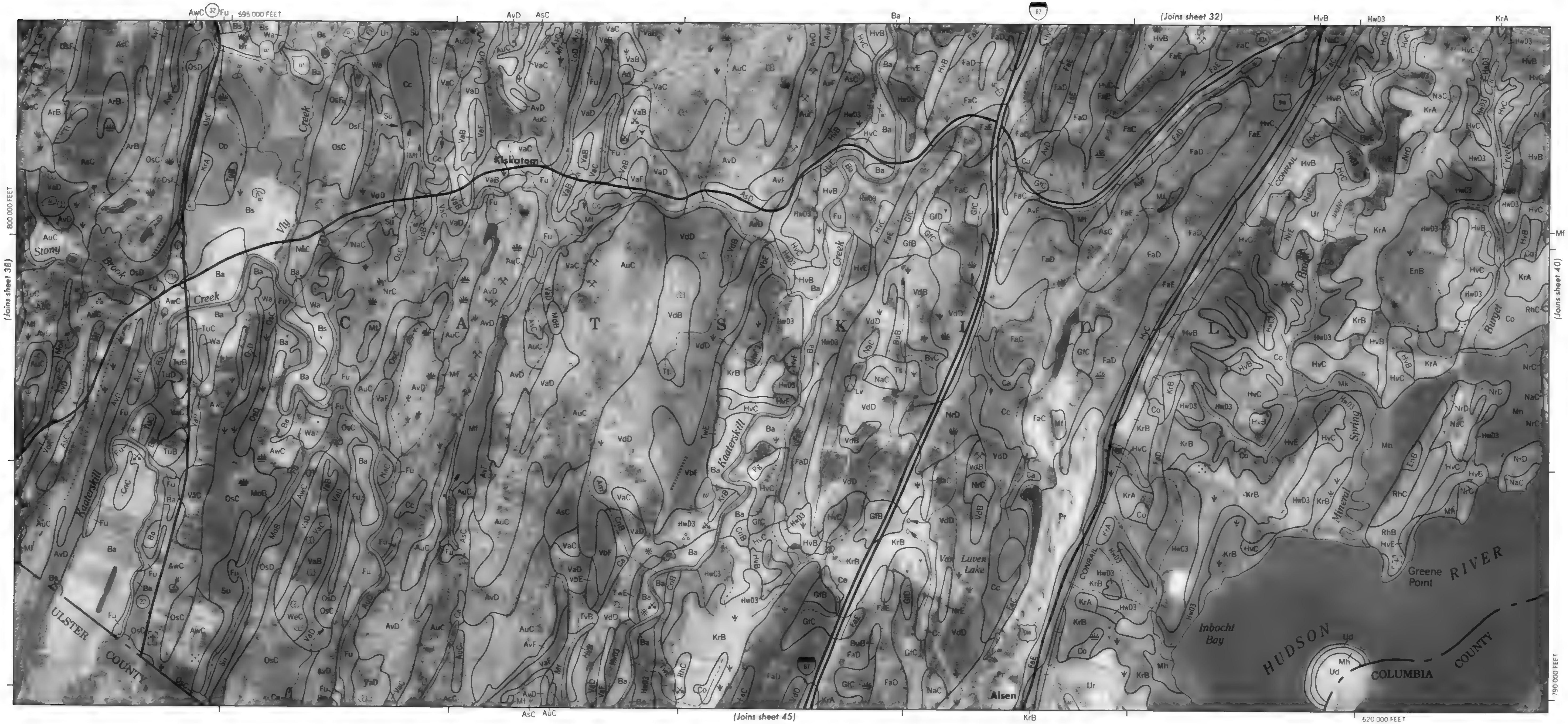


1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

N



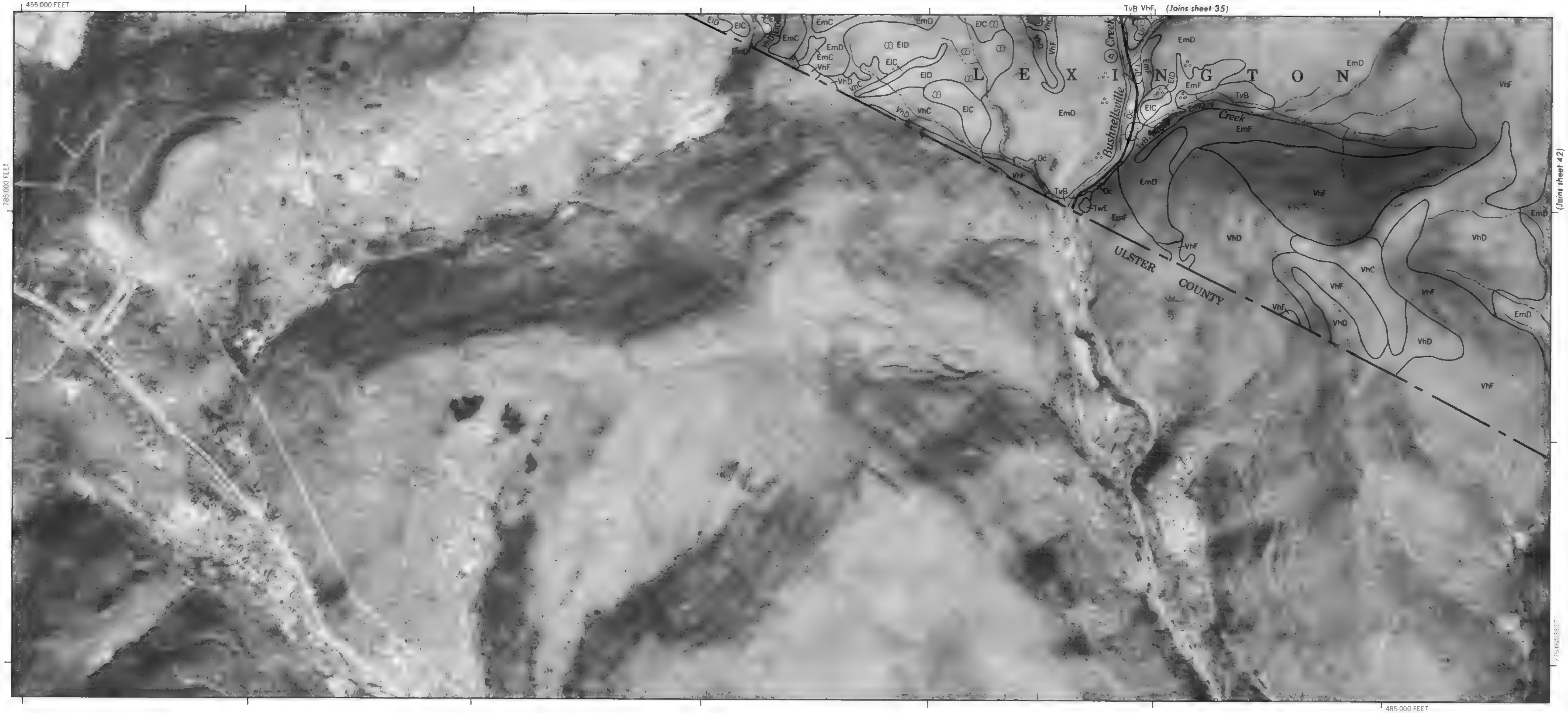
1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000


40
N
HvB EnA (Joins sheet 33)
655 000 FEET
805 000 FEET
(Joins sheet 39)
790 000 FEET
625 000 FEET
HUDSON
RIVER
COLUMBIA
COUNTY
Ramshorn Cr
Creek
Mh
1
3/4
1/2
1/4
0
1
2 MILES
1
0.5
0
1
2 KILOMETERS
SCALE 1:24 000

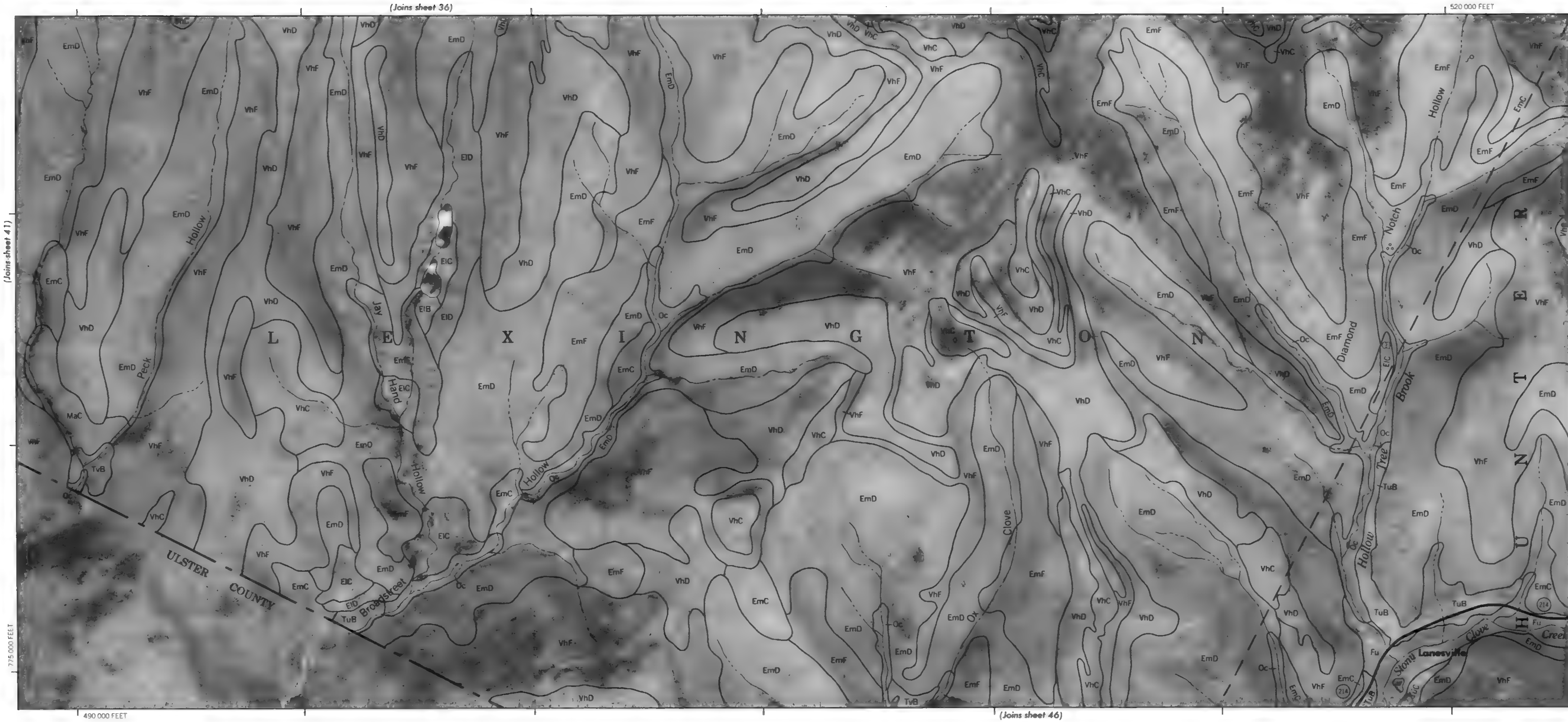
N



1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

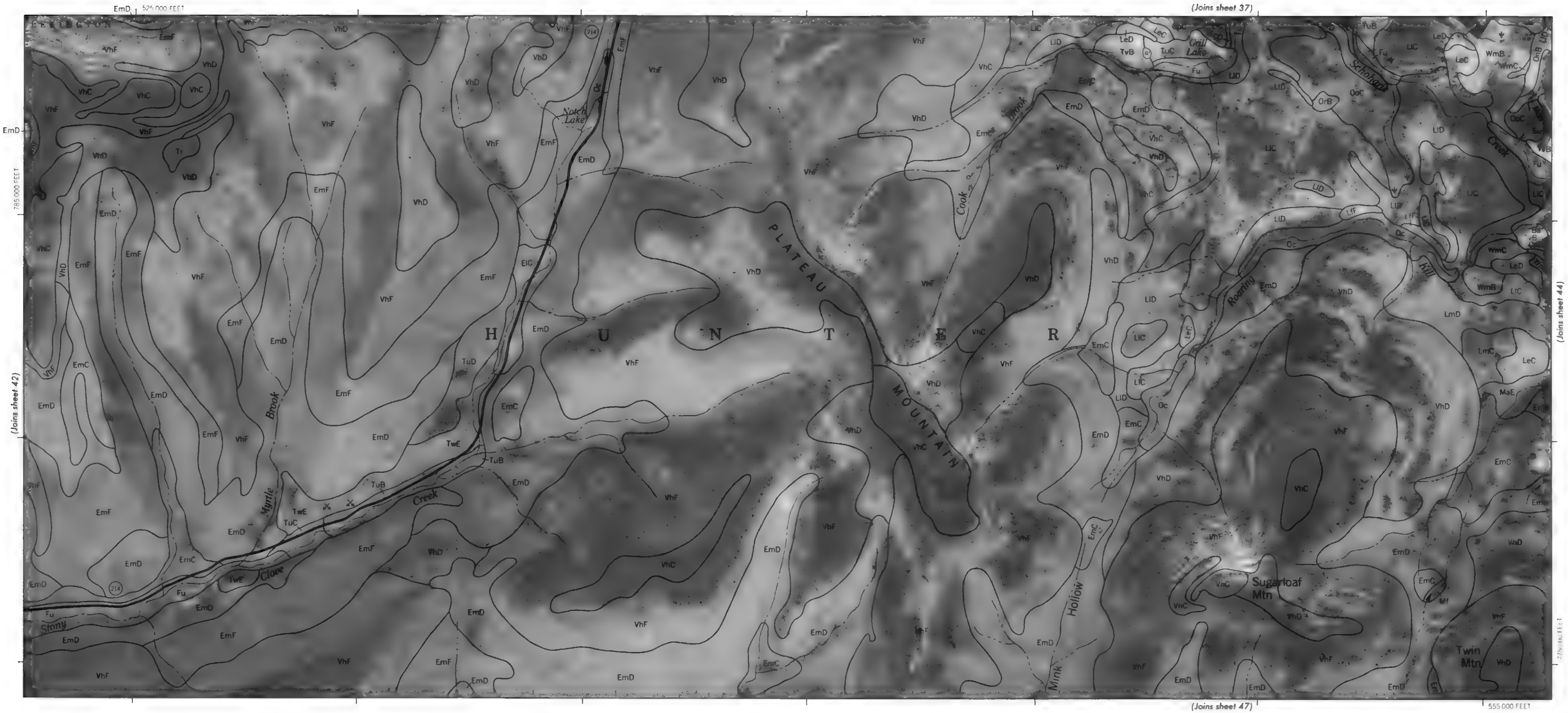
N



1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

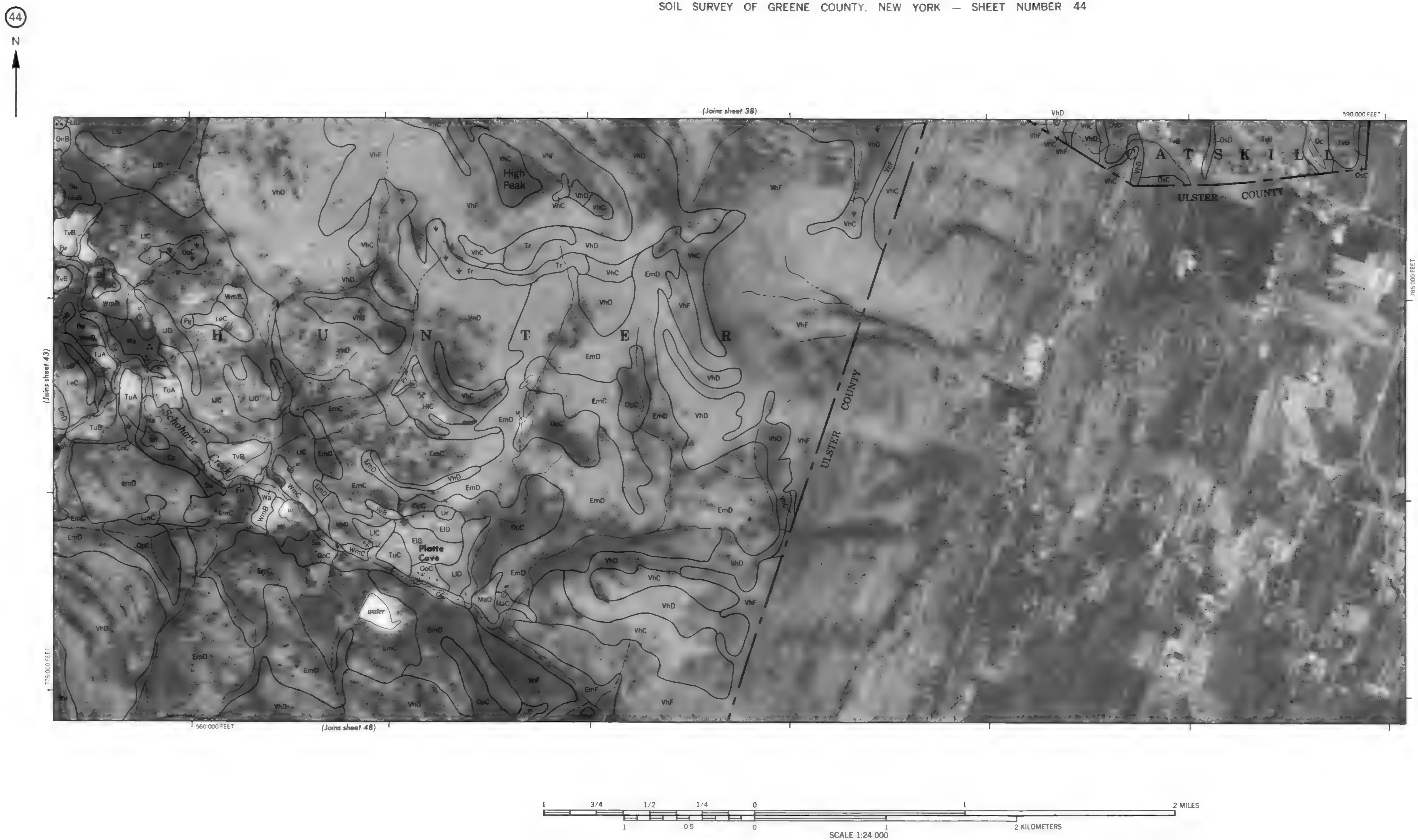
SCALE 1:24 000



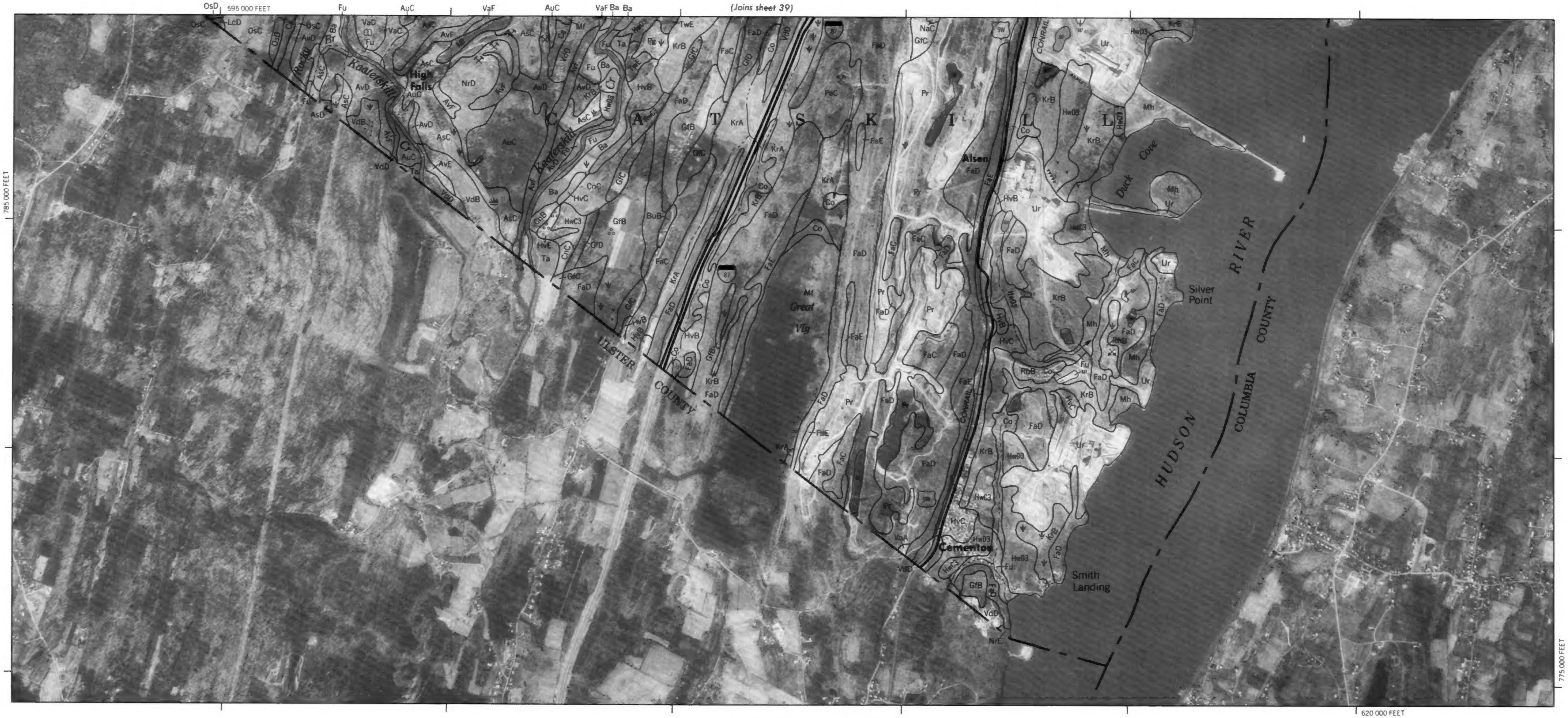
1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000


44
N
(Joins sheet 38)
(Joins sheet 43)
(Joins sheet 48)
560 000 FEET
590 000 FEET
785 000 FEET
775 000 FEET
H U N T E R
C A T S K I L L
ULSTER COUNTY
High Peak
Platte Cove
Schoharie Creek
water
1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

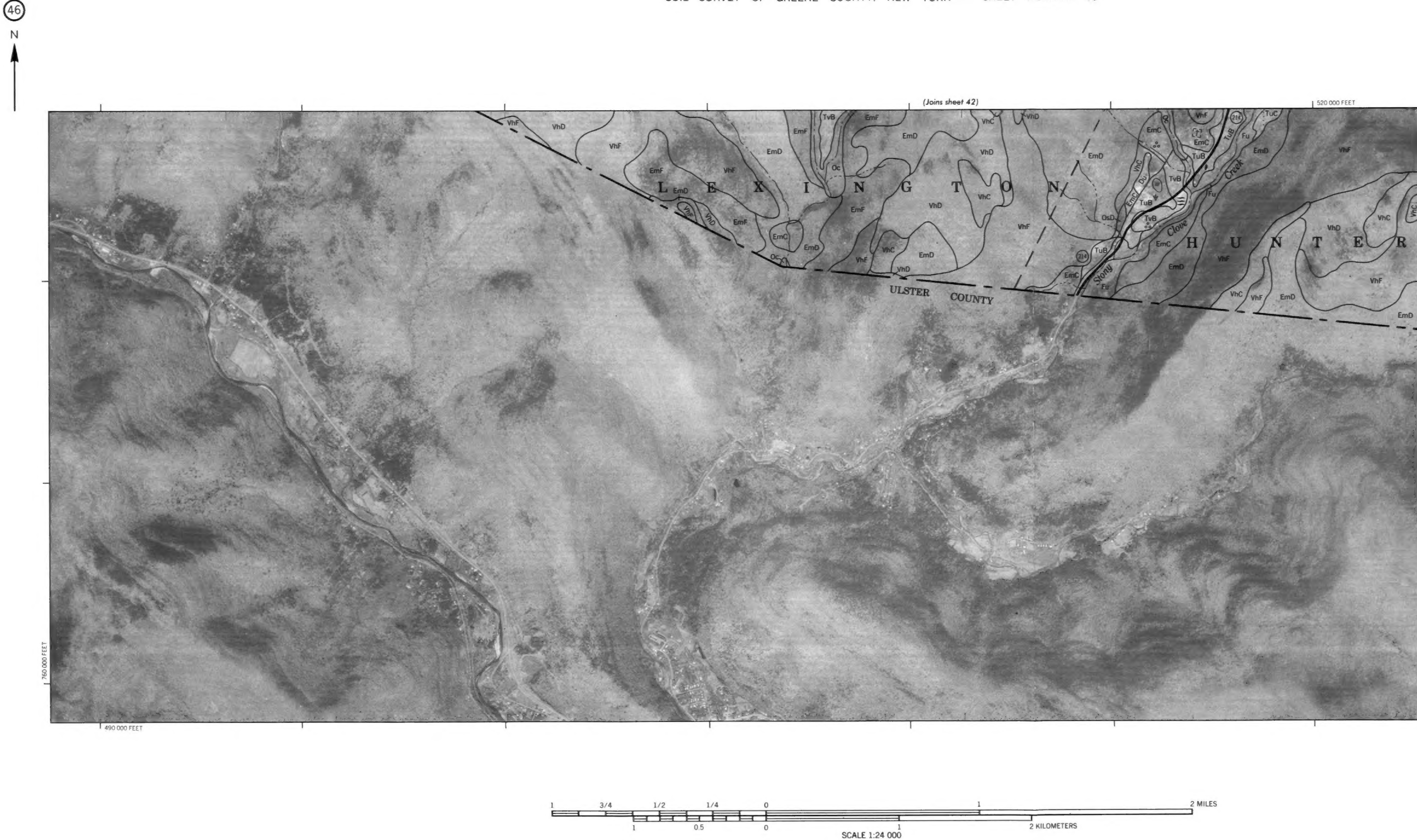
N



1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

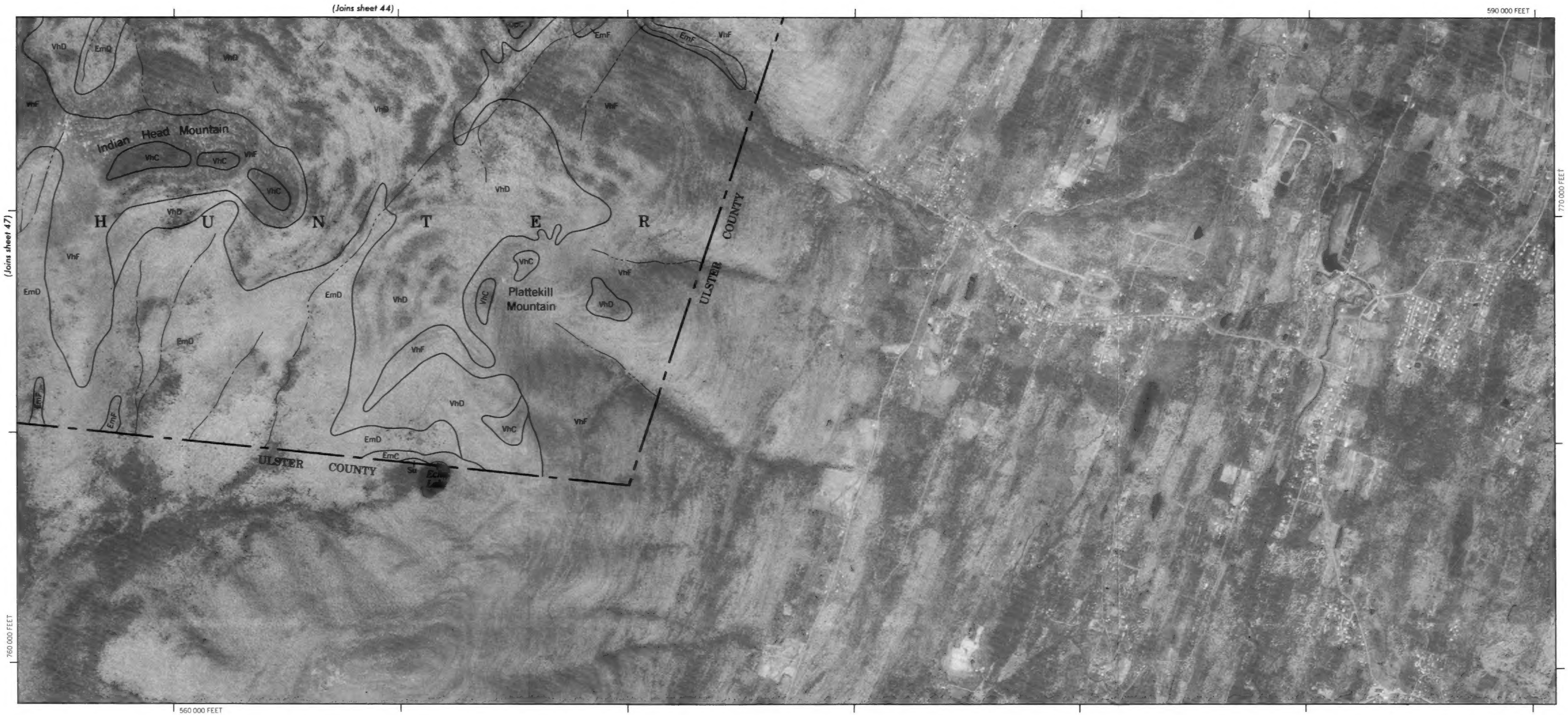
SCALE 1:24 000


N
(Joins sheet 42)
520 000 FEET
(Joins sheet 47)
770 000 FEET
760 000 FEET
490 000 FEET
L E X I N G T O N
H U N T E R
ULSTER COUNTY
Stony Clove Creek
VhF
VhD
VhC
EmF
EmD
EmC
TvB
TuB
TuC
Oc
OsD
Fu
Du
214
1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

48

N



1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000